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LE GÉOGRAPHE CANADIEN

RÉDACTEUR: W. G. DEAN RÉDACTEUR-ASSOCIÉ: G. POTVIN

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CARIBBEAN VIEWS OF CARIBBEAN LAND

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American Geographical Society

MAN AND LAND are everywhere interrelated in countless ways; all aspects of human life are intimately bound up with locale. The Caribbean, however, is often discussed as though the association there between man and land were entirely commercial. In other parts of the world, men perceive landscapes in a variety of social and cultural contexts. But in the Caribbean, and notably in its dependent areas, land is seldom mentioned (save by tourists) except as a commodity. "The status of land and man's relation to it is not a philosophical matter," according to a former director of the Jamaica Agricultural Society; "on the contrary, it is an economic one."[1] Focussing principally on the British West Indies and British Guiana, I shall first try to explain why economic standpoints have been so dominant, and then discuss other ways in which the people of these territories are aware of and value their lands.

Physical and social circumstances partly account for the preponderance of economic themes. Caribbean countries are small and densely populated, and agricultural land—much of it ecologically precarious or devastated by over-use—is virtually the sole source of livelihood. Guiana is no exception despite its size; the soils of the sparsely settled interior permit only the most rudimentary cultivation. The coastal population of British Guiana is as land-hungry as that of any West Indian island.[2]

Such circumstances are, of course, far from unique. There are many lands as crowded and as ill-used as the West Indies, inhabited by peoples equally poor and dependent on agriculture. But whatever the demographic and economic pressures in Cyprus or Ceylon, Fiji or Java, the aesthetic, religious, communal, and national significance of land in these islands is seldom lost sight of. Why is it that land in the Caribbean figures almost exclusively as a source of livelihood?

One reason, I think, is the inveterate discordance between certain Caribbean lands and their inhabitants. When one mentions the Caribbean, a few sharp images come readily to mind: sunshine and trade winds, palm trees and mangrove swamps, limestone cays and volcanic peaks—and these images are valid enough. But what are Caribbean peoples? "Chinese," "Indonesian," or "Latin American" conjures up a picture, but "Caribbean" does not: indeed, there is no adjective for the inhabitants of the area. In short, "Caribbean" is a place but not a people. It eludes ethnic, social, or cultural generalization: no one settlement form, no type of economy, no single language, religion, or ethnic group, no consistent pattern of folkways or system of values predominates there. Thus the West Indies include social units ranging in size from Cuba, with six million people, to scores of tiny islands with a few hundred inhabitants; population densities range from 1400 per square mile in Barbados to zero in Redonda; modern mechanized plantations control some territories, while others live by subsistence agriculture; political systems are characterized here by anarchy, there by tyranny, oligarchy, or democracy; some islands are peopled entirely by folk of African descent, others by substantial numbers of East Indians, Chinese, Spanish, English, French, Dutch, and by every combination of these.

West Indian heterogeneity stands in vivid contrast to the sameness of other peoples, as Lamming notes: "When the Indian team takes the field at Lords, it is a team of Indians. Some are short and some are tall; but they *look* alike. When the Australian team takes the field at Lords; it is a team of Australians. . . . But when a West Indian team takes the field at Lords . . . what do we see? Short and tall, yes; but Indian, Negro, Chinese, White, Portuguese mixed with Syrian. To the English eye . . . the mixtures are as weird and promising as the rainbow.

And the combination of the team is not a political gimmick. That is . . . in fact, the West Indian situation."[3]

West Indians are not only exceedingly diverse; they are also newcomers. Almost no West Indians are true indigenes: virtually all are descendants of post-Columbian immigrants from Europe, Africa, and Asia. To a greater extent than in North America the Indians of the Caribbean islands were eliminated by their Old World conquerers. In culture as in physiognomy, the Old World heritage still prevails. For every bowl of manioc, a thousand tons of flour and rice are consumed. The materials as well as the mode of construction of almost every artifact are European or African, not American.

Another reason for the excessive emphasis on commercial aspects of land in the Caribbean is that much of it remains colonial, ruled by governments and owned by individuals some of whom are as distant in spirit as they are in space. In every epoch possession has been divorced from residence. Far more than the North American colonies, the West Indies were considered strategic goals and production factories rather than places to live in. Few West Indian planters regarded the islands as permanent homes. Those with families usually sent the children back to Europe to be educated, and many of them never returned. Absentee ownership thus became and long remained the prevailing mode of tenure in the West Indies.[4]

Whether resident or absentee, proprietors thought of land principally as a machine for making money. They encumbered their estates with forfeitures, legacies, jointures, and annuities payable to relatives and investors remote from West Indian conditions.[5] The typical planter seldom concerned himself with the West Indian landscape beyond its capacity for producing sugar. Of an estate owner in Nevis, Eric Williams remarks: "He invested all his wealth derived from the West Indian soil and the West Indian people in railways and canals and harbours in Canada, India and Australia. . . . Massa left behind Nevis as under-developed as he had found it. The wealth that should have been ploughed back into Nevis . . . went to fertilise industrial development everywhere in the world except in the West Indies."[6]

Imperial governments were either unaware of, unconcerned about, or impotent to prevent the resulting erosion of West Indian values. As Froude summed up the situation, after a visit to the West Indies in 1887: "Roses do not grow on thorns, nor figs on thistles. A healthy human civilization was not perhaps to be looked for in countries which have been alternately the prey of avarice, ambition, and sentimentalism."[7]

The workers—the bulk of the West Indian population from the seventeenth century on—had even less reason to be devoted to the West Indian scene than did their masters. To build up a sense of attachment to the land, many planters encouraged slaves to cultivate private provision grounds, and in some cases permitted them to bequeath these lands.[8] But slaves never held legal title; and neither they nor indentured labourers were considered, or viewed themselves, as true West Indian residents. They were compelled to remain where they were; slaves who sought to escape were punished with extreme severity. After emancipation, tenants and indentured workers alike were required by law to remain on the estates.[9]

"They have no country of their own," wrote Trollope of the West Indian Negroes, "yet have they not hitherto any country of their adoption; for, whether as slaves in Cuba, or as free labourers in the British isles, they are in each case a servile people in a foreign land." No wonder, then, that "they have no idea of country,"[10] or that Schomburgk noted in Barbados "a thirst for novelty and change" which "induced a great number to leave the island."[11] Long after emancipation, Europeans still insisted that the lands were theirs alone, and complained, with Froude, that "these beautiful West Indian Islands were intended to be homes for the overflowing numbers of our own race, [who] . . . are being crowded out by the blacks from Jamaica and the Antilles."[12]

White ownership of plantations, like European political control, was also justified as best for the Negroes themselves: "Again and again it was stated that, if the plantations disappeared, the whites would leave the islands, and the black population

would then lapse into barbarism."[13] Denied possession and citizenship, West Indians remained as alienated from the West Indies as they had been during slavery. "The lan' come to look like a tyrant in their eye, an' they decide to burn whatever memory hol' them to the plough." The tragedy was, as Lamming says of his fictional island, that "San Cristobal was the only home they know, an' it was no home."[14]

The view that land is valueless save as a commodity persists in many aspects of West Indian life today. It affects agricultural development programmes which exalt production but neglect stability of tenure. It is evident in the readiness of individuals and governments to sell and lease land to foreign corporations, and in the easy faith that the highest income per acre is the greatest national good.

Alienation, as well as poverty, is at the root of the exodus of Jamaicans to England and Puerto Ricans to New York. "It is the exception for the emigrant or those he leaves behind to mourn," notes a Jamaican commentator; from the willingness of islanders to sell all they own for passage money, it is clear that "tens of thousands of West Indians would prefer to live anywhere rather than in the West Indies."[15] It is not really *their* land they are leaving, but the landlord, labourless among his empty acres. "Suppose all these people in the West Indies get pushed from the back by some terror into this flight and those islands were left, deserted," speculates one emigrant.[16] It was precisely this prospect that cheered a West Indian labour leader, who prayed "that one day I would see a ship big enough to take every working man and woman out of this island leaving only a few big men and their money."[17] Perhaps exile is essential for an appreciation of the West Indies, as one of Lamming's characters ruefully remarks: "If there is one thing England going to teach all o' we is that there ain't no place like home no matter how bad home is."[18]

This lack of attachment to country is frequently deplored by West Indians themselves. "For an Englishman home is England," notes a Jamaican journal, commenting on reactions to a suggestion that West Indian staff at the University College of the West Indies should no longer get "Home Leave" to the United Kingdom. "For a West Indian the West Indies should be home but in fact . . . defenders of 'Home Leave' for West Indians are saying that England is home for them too. And yet these gentlemen are as a rule the guardians and defenders and the protagonists of West Indian nationhood."[19] Those who reject the culture and values of the European metropolis find spiritual homes not in the West Indies but in Africa.[20] "The bias [even] of 'national' West Indian writers of the present day is in general anti-national."[21]

The ramshackle, makeshift appearance of many West Indian buildings bespeaks a similar disaffection. Despite recent improvements, the West Indies still look, as Lloyd George once said, like the slums of empire. Jan Carew notes how different the Guianese village of reality was from his dream: instead of "neat huts ringed by coconut trees, swamps with lotus lilies in bloom," he saw "broken-down dwellings balanced insecurely on stilts, outhouses with overflowing pits and hogs rooting in the muck, pot bellied children playing in muddy yards, the smell of slime and stagnant water, open stretches which the sun had sucked dry, baked and cracked."[22] In the Windwards, Pope-Hennessy found Castries a town of "ancient slums, . . . greasy hovels, rum taverns and open drains," and Roseau "a shack-town of unpainted hen-coop houses"; he concluded that "everything in the West Indies looks much better seen from some way out at sea."[23]

The larger the town, the worse it is apt to look. Derek Walcott characterizes "Kingston by Daylight"[24] as "A city like bad teeth" where "the crowds trickle under / The armpits of awnings . . . ," and the Premier of Jamaica grieves about the "tens of thousands of squatters living under the most pitiable conditions, with dozens and dozens of pockets of slum" which have to be seen to be believed, "and even when seen they are unbelievably bad."[25]

Yet there is a steady movement away from the land into these cities. However noxious the urban slums may be, they are less derelict than some of the country districts. Thus the population of Kingston and its environs has virtually trebled in two

decades, from 150,000 in 1939 to 423,821 in 1960. So depressing are the conditions of rural life that Jamaican peasants would rather see their children take any other job than work on the land.[26]

The products of West Indian soil, as well as the soil itself, are rejected as relics of slavery and shame, unfit for consumption by free men. Flavour and keeping qualities only partly explain the West Indian preference for imported foodstuffs. As the consumer moves up the social and economic scale, imported rice, wheat, and potatoes displace sweet potatoes, tannias, eddoes, cocos, and other local foodstuffs at his table. Despite the concurrent rise in population, the total production of local root crops in Jamaica showed an absolute decline during the 1950's.[27]

II

Thus West Indian property owners and residents alike traditionally repudiate West Indian land, save as a source of wealth. But although this is the most notorious tradition, it is not the only one. Rejection of the milieu implies, and often conceals, the opposite sentiment: a deeply felt attachment to the land that transcends the realm of economics. As the British Caribbean approaches independence, and as its citizens speak out with their own voices, the role of land in all its aspects—freedom, pride, status, continuity, solidarity, sovereignty—acquires greater dignity, even self-conscious glory. Yet these supra-economic values have a long, if hitherto mute, heritage of association with Caribbean lands.

The prime connotation is freedom. The aim of runaway slaves was more than flight; it was recognized sovereignty over the land itself. The Maroons' possession of territory in the Jamaican interior symbolized independence from planters and governments and secured them against re-enslavement. Rebel slaves in the Guianas acquired lands above the plantations on the great rivers, and their descendants still monopolize access along these arteries of transport.

Similar motives impelled many thousands of ex-slaves to purchase land after emancipation. It was not pride, let alone avarice, that led them to acquire property, but primarily the desire to escape bondage. Where empty land was abundant, they preferred to work for themselves than to remain tenants on sugar plantations. Where land was scarce, the acquisition of property was the only way to avoid continued servitude. So-called "Masters and Servants" acts, especially in Barbados and the Leewards, bound tenants to work on estates at far below the prevailing wages, on penalty of eviction and imprisonment. Those who did not own land, and were forbidden or unable to emigrate, were more at the planter's mercy than were indentured servants. In some territories, laws of this type remained in force until a few years ago, and there are still "tied houses," subject to demolition if the tenant refuses to work for the owner. It is not surprising that "freehold" and "freedom" have come to be closely linked in the West Indian mind.

Land-ownership provides security against economic vicissitudes as well as against landlords. For the West Indian who goes to work in the city or in a foreign land, the plot of land back home is a powerful buttress against anxiety. This is a principal function in Jamaica of "family land," which belongs to descendants in perpetuity and may not be sold. "Any member 'in need' can erect a hut on it and live rent free. . . . What cannot . . . be overstated, is the sense of security which an interest in family land gives to the man (or woman) who has a precarious livelihood and no permanent home of his own."[28]

Land also symbolizes community solidarity and strengthens family ties. In Negro villages in British Guiana, according to R. T. Smith, "the very strong feeling against alienation of permanent rights over this land to 'outsiders' is a reflection of the social solidarity of the village group."[29] Customary (as opposed to "legal" European) modes of land tenure and transmission in other communities likewise inhibit alienation of land to outsiders and strengthen internal sanctions.[30]

Gathering and distributing fruit and vegetables from family land in Jamaica fosters and enriches contacts among widely scattered relatives. For the immediate family, "ownership of land is believed to

be the only real and permanent source of security and of the means of satisfying the normal expectations which operate between men and women as prospective parents and between them and their children. And this has no connection . . . with the income which the land can provide." Land also links past, present, and future generations, as the abode of the dead and the still unborn. "Immediate as well as distant forbears are invariably buried on family land," and "the spot on which the ancestors are buried is sacred." As the stronghold of family values, it is the function of land "to reap generations."[31]

In addition to freedom and solidarity, land-ownership is associated with individual prestige. It is a mark of gentility, of general esteem, of social success. In the British Caribbean, as in Martinique, "the acquisition of a piece of land is for the small farmer a sign of his ascent into a higher social class. . . . Thereafter, the new landowner, known hitherto only by a country nickname, is called 'monsieur'."[32] To the Brooklyn Barbadian in Paule Marshall's novel, inheritance of a plot of land evoked dreams of building a house and living like a white planter.[33]

These values of land not only transcend the economic dimension; they frequently run counter to it. In Jamaica, family land is often wastefully and inefficiently used; multiple ownership restricts development, and no one troubles to put money or effort into soil from which so many others may reap the fruits. As a result, "in the process of transmission and use, [family land] has in the main long ceased to have agricultural value, apart from the economic trees with which it is usually well stocked."[34]

Freehold possession by small farmers has long been criticized as responsible for a host of evils: underproduction, excessive fragmentation of property, soil exhaustion and erosion, disintegration of the social, political, and moral order. These charges merit less credence than they have received. Mixed cultivation ensures farmers against the hazards of market prices, weather, and pestilence, provides year-round soil cover, and is potentially a more efficient converter of solar energy into food than are monocultural plantations. Moreover, what was "economic" from the point of view of the large planter or his creditors is not necessarily "economic" for the small proprietor, or even for the West Indies as a whole. The failure of peasant proprietors to maintain previous export levels seemed tragic to devotees of colonial mercantilism, but not to the smallholders themselves, who produced instead for local markets and for their own use.

The relative economic efficiency of the two systems is only of academic interest, however, because peasant proprietors did not, and do not, measure the importance of land solely in terms of production. As Curtin concludes, "The Negro settler was not principally interested in economic success. Therefore the fact that his products never replaced the exports lost by the failing estates made little difference. What did make a difference was his escape from the estates—freedom became a reality."[35] According to one observer in post-emancipation Jamaica, "The quality of the land is so bad, and freeholds so small, which these persons have purchased that it is almost an impossibility that they can reap any produce from them, and this the settlers know well; I was informed by them they wished only for homes where they could not be troubled, and that they might have the liberty of working where they might choose for their livelihood."[36] Land-ownership was often an escape route away from agriculture, not an avenue towards it. As Greenfield points out, the Barbadian who bought a freehold was thereby freed to seek remunerative and prestigeful employment off the land, went to town as an artisan or mechanic, and left the land to be tilled by hired hands.[37]

It is in terms of such values as these that land-tenure problems must be faced. "Is it feasible," asked the Development Welfare agricultural adviser, "to allow anyone to have a piece of land on terms which merely satisfy his pride? . . . To allow people to occupy land to satisfy their own feelings without regard to production or efficiency, or even the use of the land, is courting disaster on a national scale."[38] But it may also be disastrous to ignore the fact that "the ownership of land carries with it income, social prestige and political power." As W. Arthur Lewis puts it, "the social ideal, in an agricultural community,

is . . . a wide distribution of land ownership, and the absence of any considerable body of landless agricultural laborers."[39]

Similar considerations are important in the identification of land with national independence. However barren, useless, or pestilential a tract may be, the passion for sovereignty renders it precious. The leasing of West Indian bases to the United States in 1941 excited little criticism in the colonies then; but after federation, American occupation of Chaguaramas naval base in Trinidad became a major focus of attack and the principal stimulus to Trinidadian nationalism. "Trinidad belongs to the people," the Premier told the legislative council. "This place is too small . . . for all this parcellation of American territory."[40] As long as America held the base, he insisted, Trinidad could not be truly independent. The recent agreements by which the United States yielded most of the leased areas in The West Indies were widely acclaimed throughout the federation. The symbolic worth of these lands unquestionably outweighs their economic value. What made the headlines in Trinidad was that 21,000 Trinidad acres were released, not what these acres might be good for.

Finally, land in the West Indies is enjoyed increasingly by residents as a source of recreation and inspiration. Beach rights are jealously guarded by local boards of control; the Caroni swamp in Trinidad is protected as a wild-life preserve; hunting and fishing are everywhere popular; Jamaicans, more often than foreign visitors, climb Blue Mountain Peak for a view of the island at sunrise.

The evils of the past, when their ancestors were slaves on the land, no longer blind West Indians to the landscape's actual glories. Perhaps many Barbadian planters thought of little else, in Frank Collymore's phrase, than "Foreign manure and rains / And all the other things that serve / To feed their greedy canes."[41] But whether they intended it or not, they left a heritage of beauty. Similarly in Jamaica, John Hearne contemplates Brandt's Pen, his composite plantation landscape, and remarks, "All sorts of people had told me that places like this were bad. . . . But for me it was one of the places where the life of my country had been cast and carefully nourished. Whatever people had done since then, nobody had been able to make anything so efficient, so beautiful, and so enduring."[42]

West Indian writers sometimes proclaim the beauties of Caribbean lands in general terms, as by the simple recital of island names in Derek Walcott's "A Sea-Chantey":[43]

> Anguilla, Adina
> Antigua, Cannelles,
> Andreuille, all the l's,
> Voyelles, of the liquid Antilles,
> The names tremble like needles
> Of anchored frigates,
> . . . . . .
> The titles of portages,
> The colours of sea-grapes,
> The tartness of sea-almonds,
> The alphabet of church-bells,
> The peace of white horses,
> The pastures of ports,
> The litany of islands,
> The rosary of archipelagoes,
> Anguilla, Antigua,
> Virgin of Guadeloupe,
> And stone-white Grenada. . .

More often, the landscapes characteristic of particular islands are celebrated. Each has its unique pictorial and emotional quality: pastoral Barbados, with its patchwork of fields sloping to the sea, cool, ordered, and remote; Grenada's tapestried groves of cacao, nutmeg, and tree-fern; the green and jagged grandeur of Dominica. In grasslands backed by mountain forests, Jamaican poets like H. D. Carberry salute still more varied and more violent prospects on ". . . days when the rain beats like bullets on the roofs / And there is no sound but the swish of water in the gullies / And trees struggling in the high Jamaica winds."[44]

Guianese writers convey the feeling of being assaulted by nature, dwarfed by the illimitable horizons, the huge skies, the encompassing sun of their landscapes, "the swamp and river, my mother, the amber sea, the savannahs, the memory of surf and wind."[45] The sense of space and mystery is enhanced by the sweep of time, the succession of forest and settlement in the long reaches of history.[46]

Many West Indians are not content with contemplative admiration; for them the land is the very source of life, the image of man's freedom and destiny. "The heart

of an island. Where is it? / How does one feel its beat?" asks A. N. Forde:[47]

> . . . the land is greater: in it reside
> the blood-vessels
> Of a people: . . . This
> Land is God's great gift to islands
> reckoned poor
> In man's accountancy.

Especially in Guiana, the land must be tamed to be won; for Wilson Harris, possession means self-mastery: "Rule the land . . . And you rule the world." Man and land are symbolic counterparts of each other. The map of the savannas, the very name Guiana, "were as close to me as my ribs, the rivers and the flatland, the mountains and heartland. . . . I saw this kingdom of man turned into a colony and battleground of spirit, a priceless tempting jewel I dreamed I possessed."[48]

In the islands, too, "dirt was cheap, . . . but land was the land, priceless, perennial and a symbol of some inexplicable power."[49] This identification of land with man's deepest desires is no less passionate for being sometimes political. Nationalism, writes Lamming, is "the private feeling you experience of possessing and being possessed by the whole landscape of the place where you were born, the freedom which helps you to recognize the rhythm of the winds, the silence and aroma of the night, rocks, water, pebble and branch, animal and bird noise, the temper of the sea. . . . It is the bond between each man and that corner of the earth which his birth and his work have baptised with the name, home."[50] Freedom sets beauty free, as in M. G. Smith's "Jamaica":[51]

> I saw my land in the morning
> And O but she was fair
> The hills flamed upward scorning
> Death and Failure here
>
> I saw through the mists of morning
> A wave like a sea set free
> Faith to the dawn returning
> Dark tide bright unity.

Caribbean land and Caribbean people do, in fact, belong to each other more than at any time for centuries past. And the equation is a complex one, as it must be wherever men live together in freedom and view life as more than a mere struggle to survive. "I know San Cristobal," writes Lamming of his archetypal West Indian island. "It is mine, me, divided in a harmony that still pursues all its separate parts. No new country, but an old old land inhabiting new forms of men who can never resurrect their roots. . . . So old and yet so new, no place, this land, but a promise."[52] All the facets of tropical agriculture, its costs and its profits, cannot begin to convey what that promised land means to its people.

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> Why not send us all back home?
> Send all Catholics to Rome
> Ship our Scots back to their heather,
> English back to rainy weather.
> . . . . . .
> Send every single person back
> To Syria, China, Cayman Brac;
> And should we population lack
> Go out and find an Arawak. . . .

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RÉSUMÉ

Les rapports entre l'homme et la terre sont partout multiples et divers; il existe des liens étroits entre presque tous les aspects de la vie humaine et le milieu. Pourtant, on discute souvent des Antilles comme si les relations entre l'homme et la terre y étaient purement d'ordre commercial.

Ce sont des conditions physiques et sociales qui expliquent en partie cette prépondérance des thèmes économiques. Le monde dont il est ici question est formé de pays petits et densément peuplés, où les terroirs agricoles — dont plusieurs sont écologiquement précaires et à demi ruinés par des pratiques abusives — constituent la base presque exclusive de la subsistance des hommes. Pourquoi alors porte-t-on tant d'attention à cet aspect économique ?

Le contraste marqué qui existe entre certaines parties des Antilles et leurs habitants nous fournit une première raison. Si l'on associe assez facilement à cette région certains traits caractéristiques communs à ses paysages, il n'existe vraiment pas d'épithète pour décrire le degré d'hétérogénéité qui marque ses habitants. Ce sont de plus des nouveaux-venus. Personne, ou presque, n'est vraiment indigène parmi les Indiens occidentaux : l'héritage de mondes plus anciens marque leur culture aussi bien que leur physionomie.

Une autre raison de cette importance exagérée qu'on prête aux aspects commerciaux de l'utilisation du territoire réside dans le fait qu'une large portion des Antilles est demeurée sous l'emprise du régime colonial, administrée par des gouvernements et possédée par des individus dont bon nombre en sont éloignés par l'esprit aussi bien que par les distances. Résidents ou absents, les propriétaires n'ont songé à cette terre que comme machine à accumuler des profits. Les travailleurs — qui représentent la majeure partie de la population des Indes occidentales à compter du dix-septième siècle — avaient même moins que leurs maîtres des motifs d'attache à ce monde nouveau. Jamais l'esclave ne posséda légalement des titres de propriété; ni lui ni l' « indentured labourer » (travailleur à long forfait sans clause pécuniaire) n'étaient considérés, ou ne se considéraient eux-mêmes, comme vraiment citoyens des Indes occidentales. Ils étaient forcés de demeurer où ils se trouvaient, même après l'émancipation. Ainsi, les résidents aussi bien que les propriétaires répudiaient cette terre qu'ils ne considéraient que comme source de richesse.

Cette répudiation du milieu implique toutefois et sert souvent à dissimuler un sentiment opposé : une affection profonde et indépendante des considérations purement économiques. A la veille de la déclaration de l'indépendance politique des Indes occidentales, alors que les citoyens peuvent faire entendre leurs propres voix, le rôle de la terre dans tout ce qu'elle symbolise — liberté, fierté, émancipation sociale de l'individu, continuité, solidarité, souveraineté — acquiert une plus grande dignité et même un certain degré voulu de gloire.

Le concept de liberté est celui qu'on associe d'abord à l'idée d'indépendance. Après l'émancipation, l'acquisition d'une parcelle de terre devient non seulement une occasion d'échapper à la tutelle du maître, mais aussi, dans bien des cas, la seule façon de briser les liens d'une servitude permanente. « Franc-terroir » et « liberté » sont maintenant associés très étroitement dans l'esprit des Indiens occidentaux. D'autres aspects de la pleine propriété viennent accentuer ce sentiment : sécurité contre les vicissitudes économiques, solidarité communautaire et familiale, prestige de l'individu et, non moindrement, indépendance nationale. Aux Antilles, maintenant plus que jamais dans le passé, la terre et l'homme appartiennent de fait l'un à l'autre. Tous les aspects de l'agriculture tropicale, ses coûts et ses profits, même vus dans leur entier, ne peuvent laisser soupçonner tout ce que cette terre promise symbolise aux yeux de ses habitants.

PHYSICAL INFLUENCES ON PEASANT AGRICULTURE IN NORTHERN HAITI

HAROLD A. WOOD

McMaster University

IN THE PERENNIAL DEBATE as to whether the human or the physical element exerts the greater influence over economic activities, no conclusion is in sight. In fact, the debate may well be meaningless, for it does not seem possible to assign to absolute necessities any logical order of priority. Hence, to discuss some of the influences of the physical environment upon peasant agriculture in the Caribbean is to affirm not that they are all-important, but that they should never be ignored. This point of view will be developed with reference to native farming in the Département du Nord, Republic of Haiti, an area some 1,500 miles in extent (Figure 1).

One factor contributing to the close relations between physical and economic elements in this area is its dense population. With over 350 persons per square mile, this is the most thickly settled subdivision of the most densely populated republic of the Americas. To discover the optimum use of each parcel of land has been a matter of real urgency for the people of the Département.

This discovery, fortunately, has been facilitated by the pattern of land holdings. Peasant farms, despite a small total acreage, are often fragmented. Many individuals have two plots, some as many as four or five, separated from one another by distances of up to about four miles. Consequently, local differences in crop potentials are quickly perceived; indeed, in the selection of sites, areas with contrasting physi-

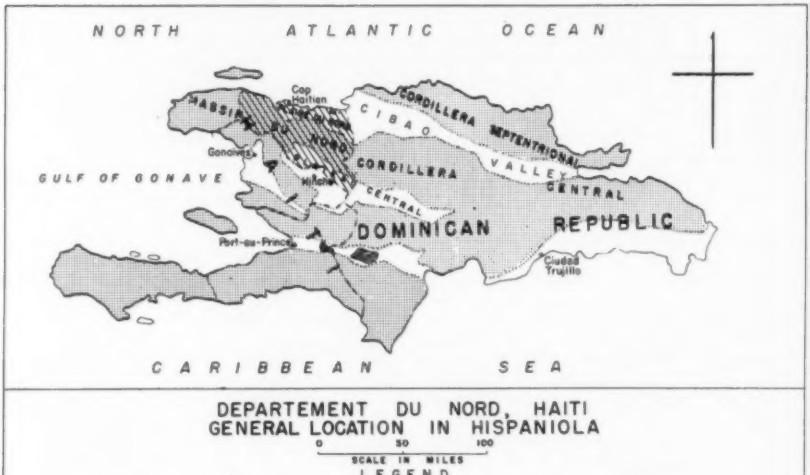

FIGURE 1

cal characteristics are often deliberately chosen since it is realized that they will be agriculturally complementary.

In many parts of the world, of course, physical variations over distances of four miles are rather slight. In northern Haiti, however, a complex geomorphic history and a variety of climatic controls have produced a landscape so intricately differentiated as to form an almost ideal geographical laboratory.

Structurally, most of the Département du Nord is part of a great anticline trending in a southeast-northwest direction and plunging to the northwest. Peneplanation and redissection have exposed its core, composed of coarse-grained granite and fine-textured quartz diorite, while upon its flanks there remain outcroppings of shale and limestone beds as well as massive intrusions of basalt and andesite. There are also two small cones of effusive materials (Figure 2). As one would expect, the erosion of such varied materials has resulted in a considerable diversity of landforms. Rounded hilltops of limestone and granite contrast with knife-edge ridges of softer rock. Valleys are correspondingly rather open or steep and narrow, while some quite extensive basins have been formed where streams flow from less resistant formations through those which are harder. Maximum elevations are between 3,000 and 4,000 feet.

Along the coast, conditions are equally complex, for the western half of the shore is submergent, with tombolos, baymouth bars, and lagoons in various stages of infilling, while the eastern shore is emergent. Here lies the Plaine du Nord,

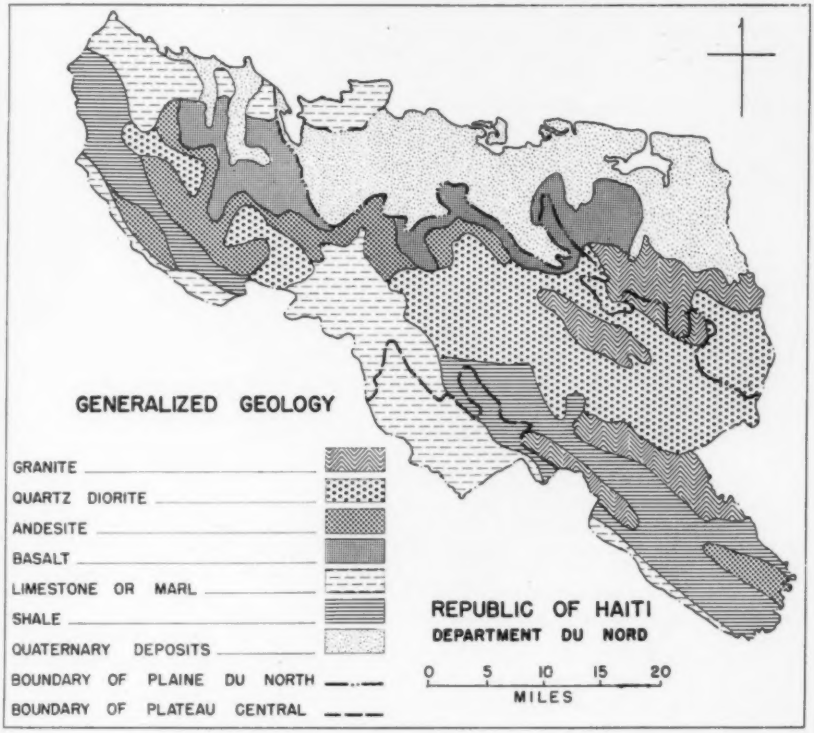

FIGURE 2

often considered to be relatively homogenous because of its low relief, yet containing great wave-cut rock terraces and emerged coral reefs as well as uplifted areas of unconsolidated material including beach ridges, river deltas, and mangrove swamps.

To this physiographic diversity is added a considerable variety in climatic conditions. Most of the area receives summer convectional rain in amounts ranging from 25 inches to 45 inches for the period of April to September. However, winter precipitation, which is orographic and cyclonic in origin, is less evenly distributed. From October to March some sections receive as much as 48 inches of precipitation, and others as little as nine inches. Hence, parts of the Département have rain all year, while others have a severe and protracted dry season. Most places receive the bulk of their rainfall in summer, but some have a winter precipitation maximum (Figures 3 and 4).

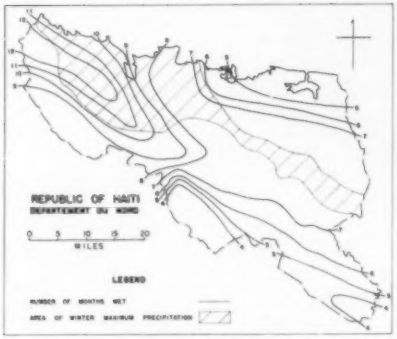

FIGURE 3

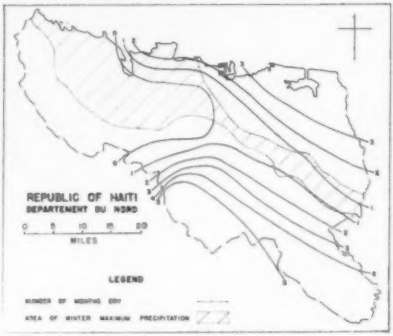

FIGURE 4

The complexity of the physical environment is perhaps most clearly appreciated when one examines the distribution of soils, in which the influences of structure and climate are both seen. Classifying the soils of the Département solely in terms of the nature of the parent materials and the maturity of profile development, no less than forty-eight distinct soil types may be recognized. To give some impression of the intricacy of their distribution, a representative section of the soils map prepared for the Département by the author is presented with this paper as Figure 5.

Considering next the effects of these physical elements upon peasant agriculture, a very strong influence, as one would expect, is found to be that of climate. The total amount of precipitation, however, is of less significance than its distribution throughout the year, and the peasant's yearly rhythm of activity is closely related to the relative lengths of the wet and dry seasons. (The author uses here the criteria set forth by Mohr and Van Baren (*Tropical Soils*, The Hague, 1954), namely that months with over 100 mm. of rain may be classed as wet, while those with under 60 mm. are dry, except in the case of a month immediately following a "wet" month.) In the northwest, where no months are dry, tree crops such as coffee and cacao do particularly well, while the planting and harvesting of corn, sugar-cane, plantains, taro, yams, manioc, sweet potatoes, and other vegetables proceed without seasonal interruptions on soils of all types. Of all the common food crops, only rice is seasonal in its growth; even these areas experience seasons of minimum rainfall during which rice will thrive only in lagoons or in other areas with a high water table.

Where one month is dry, the only crop which disappears is cacao, and, for the others, seasonality of production is imposed only in sandy soils. Where two

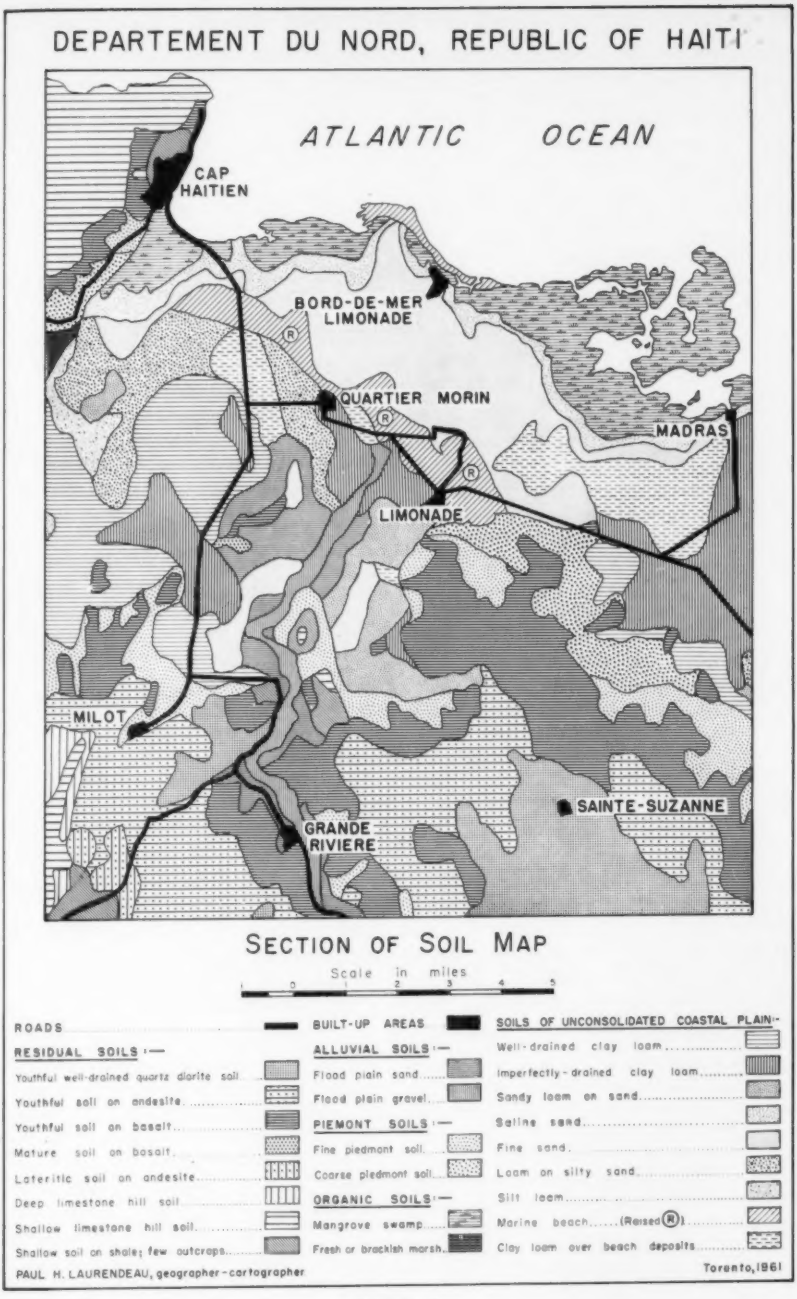
DEPARTEMENT DU NORD, REPUBLIC OF HAITI
ATLANTIC OCEAN
CAP HAITIEN
BORD-DE-MER LIMONADE
QUARTIER MORIN
MADRAS
LIMONADE
MILOT
SAINTE-SUZANNE
GRANDE RIVIERE
SECTION OF SOIL MAP
Scale in miles
0 1 2 3 4 5
ROADS
RESIDUAL SOILS:—
Youthful well-drained quartz diorite soil
Youthful soil on andesite
Youthful soil on basalt
Mature soil on basalt
Lateritic soil on andesite
Deep limestone hill soil
Shallow limestone hill soil
Shallow soil on shale; few outcrops
BUILT-UP AREAS
ALLUVIAL SOILS:—
Flood plain sand
Flood plain gravel
PIEMONT SOILS:—
Fine piedmont soil
Coarse piedmont soil
ORGANIC SOILS:—
Mangrove swamp
Fresh or brackish marsh
SOILS OF UNCONSOLIDATED COASTAL PLAIN:-
Well-drained clay loam
Imperfectly-drained clay loam
Sandy loam on sand
Saline sand
Fine sand
Loam on silty sand
Silt loam
Marine beach (Reased (R))
Clay loam over beach deposits
PAUL H. LAURENDEAU, geographer-cartographer
Toronto, 1961

FIGURE 5

months are dry, the same crops are grown, but year-round production occurs only on clay soils. In places with three dry months, all cultivation of annual plants is on a seasonal basis, while coffee and plantains may be grown only on favoured sites. Four successive dry months are fatal to both coffee and plantains; under these conditions the only crops which can survive throughout the year are manioc, sugar-cane, sisal, and castor beans (Figure 6).

food is almost always available. Throughout the remainder of the Département, there are periods of surplus and periods of deficiency, but as these do not occur everywhere at the same time, they are in large measure mitigated by local trading (Figure 7).

As the dry season lengthens, with a corresponding curtailment of the period of rapid plant growth, there is not only a seasonal cessation of production but also a reduction in annual yields per acre of

FIGURE 6

As one might expect, prolonged seasonal interruptions of production can lead quickly to food shortages in an area, such as Haiti, where facilities for food storage are meagre. The northeast and the extreme southeast of the Département, which are particularly dry, seldom have enough food to satisfy local requirements, while in the humid northeastern hills, and in adjacent sections of the northern plain,

cropland. In addition there is a decline in the amount of land used for crops at any one time, for the lower the precipitation, the slower the rate of rock disintegration and the longer the interval of rest required for the land after each period of cultivation. The best land in the humid northwest is planted every year while poorer fields are usually cultivated about two years out of three. On the

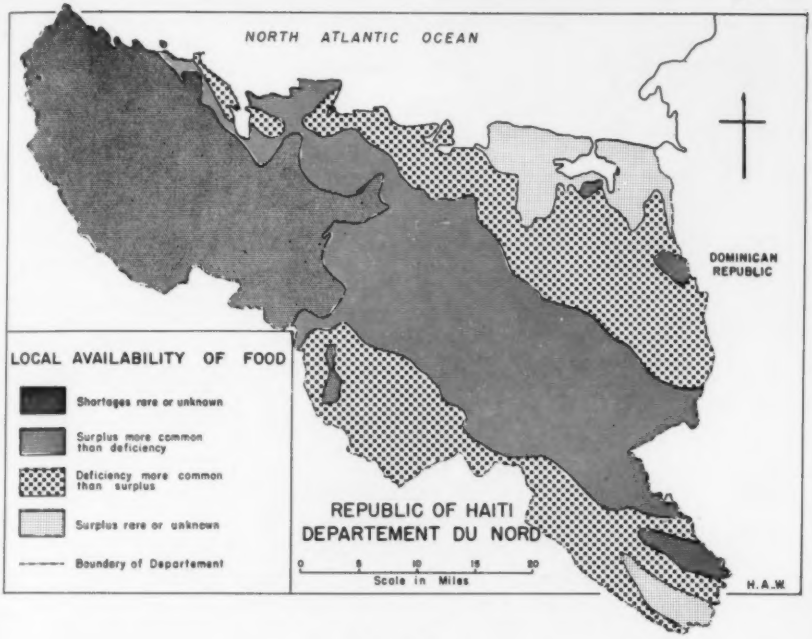

FIGURE 7

other hand, regularly farmed sections of the drier parts of the Département are actually under crops only about one year in three. Some areas are so unfavourable for agriculture that a rest period of five to ten years may be required after each year of cultivation; under these circumstances, land holdings are not only relatively large but rather ill-defined (Figure 8).

Turning now to the influence of parent materials and soils on agriculture, it may be noted in general that their most significant variables are their chemical composition and their capacity for moisture retention as expressed in soil texture and the depth of overburden. It has been already suggested, for example, that excessive drainage increases the rigour of the dry season, thus affecting all agriculture to some extent. On the other hand, the effect of poor drainage is more selective. It inhibits the production of manioc, coffee, and cacao, but may be advantageous, especially in drier areas, for crops such as rice.

More striking is the influence of the depth of overburden where it is residual. Wherever this depth was found to be in excess of four feet, the land was susceptible to gully erosion, mature soils were highly leached and too sterile for most crops, and even youthful soils were only moderately productive. With overburden less than four feet in depth, leaching does not appear to be a serious problem, and even on clean cultivated hillsides with slopes of over 60 per cent, gulleys were not observed except in areas of quartz diorite, where there is a high clay content in the soil. Very shallow overburden, however, is a disadvantage; where it is less than six inches thick, coffee and plantains do not thrive, and a long rest period is required for the land, during which time guinea grass is often used as a

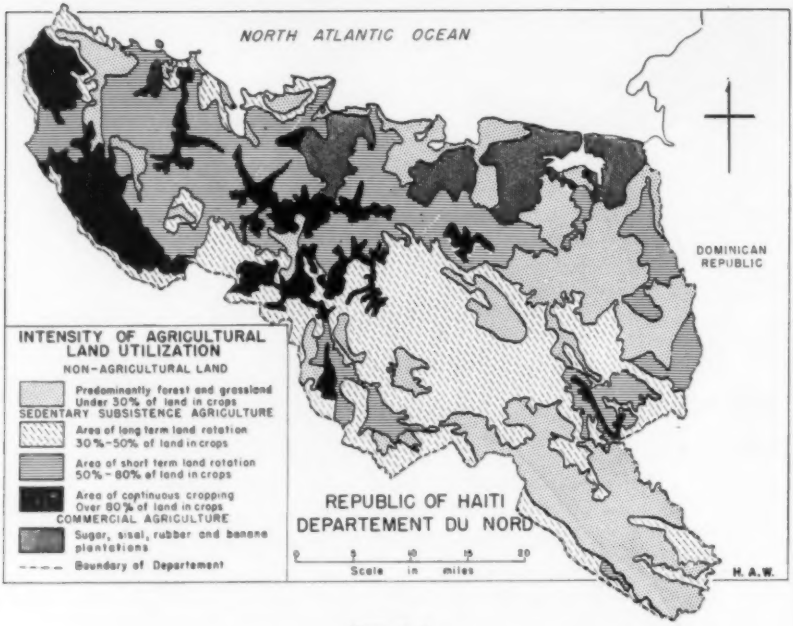

FIGURE 8

cover crop. Where there is less than two inches of unconsolidated material, agriculture becomes impossible.

The optimum range in the depth of overburden is, therefore, from six inches to four feet, but since the conditions under which these depths are found, and the agricultural productivity of the soil, are directly related to bedrock types, the more important of these will be briefly examined.

The granite of the Département weathers to produce a layer of coarse quartz sand which is quite infertile. Furthermore, where the relief is low and the dry season pronounced, a laterite hardpan commonly develops at depths of six to eighteen inches within the soil. These soils are essentially non-agricultural. Granitic areas without laterite are mainly in forest; those with laterite have a cover of coarse grass.

In the soils developed on quartz diorite, there are still many quartz crystals, but they are held in a massive matrix of clay. Depth to bedrock is one to three feet, moisture retention is good, but fertility is low. Most areas of quartz diorite are cultivated regularly; the most common crops are the tolerant manioc, rice, and beans.

Upon the andesite the eroding regolith is renewed so rapidly by the weathering of the bedrock that it may be considered to be almost indestructible. Even on cultivated slopes of over 70 per cent, there exists a continuous layer of overburden at least one foot deep, and in most areas the depth to bedrock is three to four feet. The soils, freshly formed from rock rich in plant nutrients, are fertile. They produce all the common crops of the Département, and where they occur in dry areas they support islands of cultivation surrounded by stretches of woods or pasture.

Basalt weathers even more rapidly than andesite; however, the weathering is accompanied by severe sheet erosion so that the overburden is found to be quite

shallow, generally from six to twelve inches in depth, and thus rather droughty. Nevertheless, virtually all the land is used for agriculture. The main crops are guinea grass, manioc, and sweet potatoes.

The limestone weathers unevenly to form pockets of fertile soil up to twenty inches in depth interspersed with pinnacles and ridges of rock. Despite their forbidding appearance, these areas can be productive, and all crops are grown. Their main disadvantage is that travel through them is very difficult.

too shallow for any farming. However, in more humid shale areas, one finds up to two or three feet of residual silt loam even on steep cultivated slopes. A variety of crops can be grown, but the most characteristic is corn, for which these soils are particularly well suited chemically.

The final point to consider is the effect of the foregoing upon population distribution (Figure 9). Here narrow generalizations may be misleading as the techniques used in house construction limit the choice

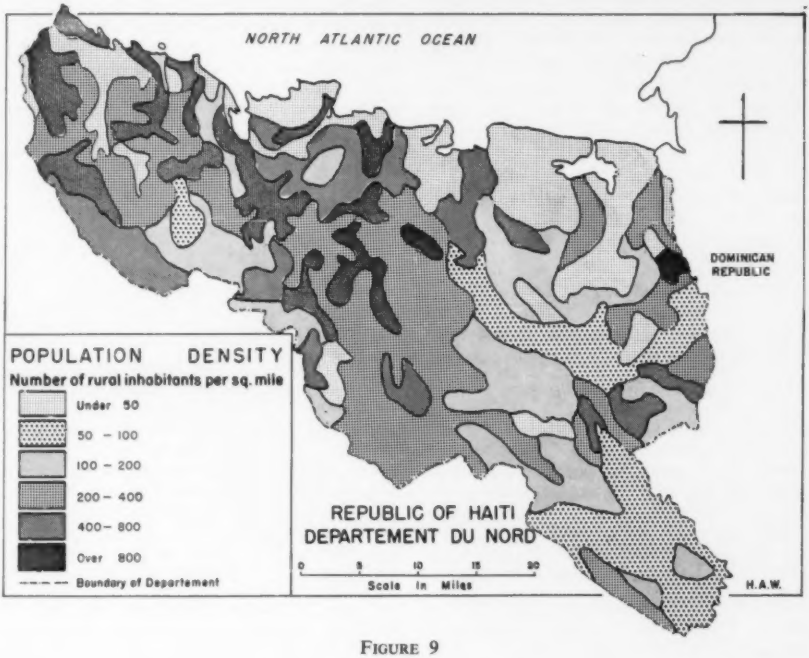

FIGURE 9

On the shale, the soils are more varied than in the other types of bedrock due to the greater influence of climate upon the rate of weathering. Indeed, where the wet season is under six months in length, this rate is too slow to support agriculture on hill slopes except on the basis of a long-term land rotation. Where the wet season is less than four months in duration, the overburden is everywhere

of sites to fairly level areas, while the availability of water is a further locative factor for dwellings. Some of the best farmland in the Département has few houses built on it, while sizable villages may occupy relatively poor land. Nevertheless, it is evident that the human carrying capacity of the land is mainly a function of the length of the dry season. In areas with fewer than two dry months per

year the best land supports over 800 persons per square mile, while densities of over 400 per square mile are found everywhere except on rugged limestone hills and in places with lateritic soils. On the other hand, where the dry season exceeds two months in duration, population densities are less than 200 per square mile except in areas of low relief with heavy-textured soils or a high water table. Where soils are particularly shallow or sterile, there are less than 100 persons per square mile.

In conclusion, the peasant of northern Haiti has worked out an extremely close relationship between the physical qualities of the land and the use made of it. This relationship is not only close; it is also stable. In almost all areas, fields are adequately rested between periods of cultivation, and the demands made on the land do not exceed its capacity to satisfy them. However, it is not possible for much greater demands to be met under current farming techniques and with existing crop varieties.

RÉSUMÉ

La partie septentrionale de la République d'Haïti offre un paysage où les traits humains sont assez uniformes et font contraste avec les éléments physiques, qui sont extrêmement divers. A l'intérieur d'un territoire d'environ 1500 milles carrés, on peut rencontrer des buttes de granite, de diorite quartzeuse, de basalte, d'andésite, de schistes ou de roches calcaires aussi bien que des plaines d'abrasion, des basses-terres alluviales et des formations marines de soulèvement. Les variations climatiques sont telles que certains endroits jouissent de douze mois d'humidité par année, tandis que d'autres n'en ont que trois et cinq mois de sécheresse.

La densité moyenne du peuplement dépasse 350 par mille carré. La majorité des habitants pratiquent une agriculture de subsistance et usent de techniques et d'instruments de caractère primitif pour la culture de terroirs qui sont ordinairement petits et fragmentés. Comme la terre arable est en grande demande et que, par ailleurs, les paysans possèdent des champs dans des parties diverses du territoire, où les traits physiographiques et climatiques diffèrent, on a appris à la longue à apprécier l'importance de l'aménagement optimum de l'espace. Il existe en général un rapport étroit et stable entre le potentiel des terroirs et l'usage qu'on en fait.

Le climat influe de façon particulièrement marquée sur la saison des plantations et des récoltes de même que sur la durée du repos que la terre doit recevoir après une ou deux années de culture. Dans les aires humides, tous les mois sont propices aux plantations et aux récoltes et on dispose toujours de nourriture. Dans les régions plus sèches, l'agriculture a un caractère purement saisonnier et les disettes se font régulières. On doit noter cependant que les seules denrées cultivées dans les régions humides qui sont tout à fait absentes des territoires arides sont le cacao, le café et les plantains. Les variations locales dans la distribution de chaque culture peuvent être largement attribuées à la qualité changeante des sols qui, dans la pluplart des cas, n'ont pas atteint la maturité et de ce fait s'apparentent de près à la roche-mère.

Ces facteurs influent à leur tour sur la distribution de la population. Les aires les plus productives peuvent supporter jusqu'à 800 personnes par mille carré, tandis que, dans les secteurs plus pauvres, la densité tombe à moins de 100 par mille carré.

THE EFFICIENCY OF JAMAICAN PEASANT LAND USE

DONALD Q. INNIS

Queen's University

JAMAICAN PEASANTS are Negroes whose ancestors came to Jamaica before 1807 —in the bad old days of the slave trade. Most of these ancestors had not been slaves in Africa, but farmers who were rounded up from their homesteads and brought to Jamaica to grow sugar. The mountainous interior of Jamaica provided land on which many slaves grew their own food; sugar was grown on the flat land. Thus many African agricultural techniques were preserved and are used today by the peasant population. Peasant farming is the major industry in Jamaica, so that a study of its efficiency is of some importance.

The peasants are mainly crop farmers, keeping only a few animals such as pigs, goats, chickens, and cows—in that order of importance. The main crops grown are corn, yam, taro, banana, cassava, sweet potato, and beans. In the highland areas, such as the one discussed here, coffee, Irish potatoes, and ginger are also important. In lower areas sugar, mangoes, citrus fruits, and breadfruit are the principal additional crops.

Peasant farmers are most concerned with feeding themselves and their families. Of the ten most important highland crops, the only plants not primarily starchy are coffee, ginger, and beans. The second concern of the peasant is to grow crops for sale in the market or for export. Income from the sale of coffee, ginger, bananas, Irish potatoes, and beans buys dried fish, beef, goat, mutton, rice, and flour to add to the high starch diet. Tools, clothing, and utensils must also be purchased, so that the peasants are not purely subsistence farmers.

The highland area of Manchester parish, used as an example for this discussion, is fairly typical of Jamaican peasant agriculture although some crops are different in other areas. Few peasants have farms in the lowland plains, where there are extensive sugar plantations, and where more pronounced dry seasons are the general rule. The farms in this case study are the average size for the island—seven acres. The maps of peasant fields showing every plant in each field (Figures 1 and 2) portray one of the main peculiarities of peasant agriculture—plant mixing. The fields mapped are west of Christiana, but not within the Christiana Land Authority area.

The first map (Figure 1) shows a half-acre field near a house, as it was in the summer of 1951. Just outside the kitchen, spice, fruit, beverage and medicinal plants are grown. Examples of the latter include red pepper and pimento, ackee, avocado and citrus, the dandelion tree and fever grass. A pig and bees are also kept there. Farther from the house is a mixture of bananas and coffee, the former shading the latter. With these, corn, Irish potatoes, citrus, gungo peas, and avocado are grown. Along the road the tall Napier grass is grown as cattle fodder; in the field behind it coffee, sugar, taro, and cassava are planted, but corn and gungo peas are the main crops here. A little farther down the road, yams and corn are the principal crops, but taro, cassava, Irish potato, gungo peas, and citrus are also grown between the rock piles. There are five varieties of yams here, showing the peasant preference for diversity even within one species.

This plant mixing, which is so typical of Jamaican peasant agriculture is also practised by peasants in the Americas and in Africa. It is also characteristic of natural selva vegetation. Europeans throughout history have deplored this higgledy-piggledy type of agriculture, perhaps because it is different from European agriculture. The words "haphazard," "wasteful," "untidy," "primitive," and "unscientific" have been used to describe this widespread agricultural method which almost certainly evolved from thousands of years of African empirical experimentation. Agricultural advisers in Jamaica advocate one crop for each field, because bananas, corn, or yams will produce

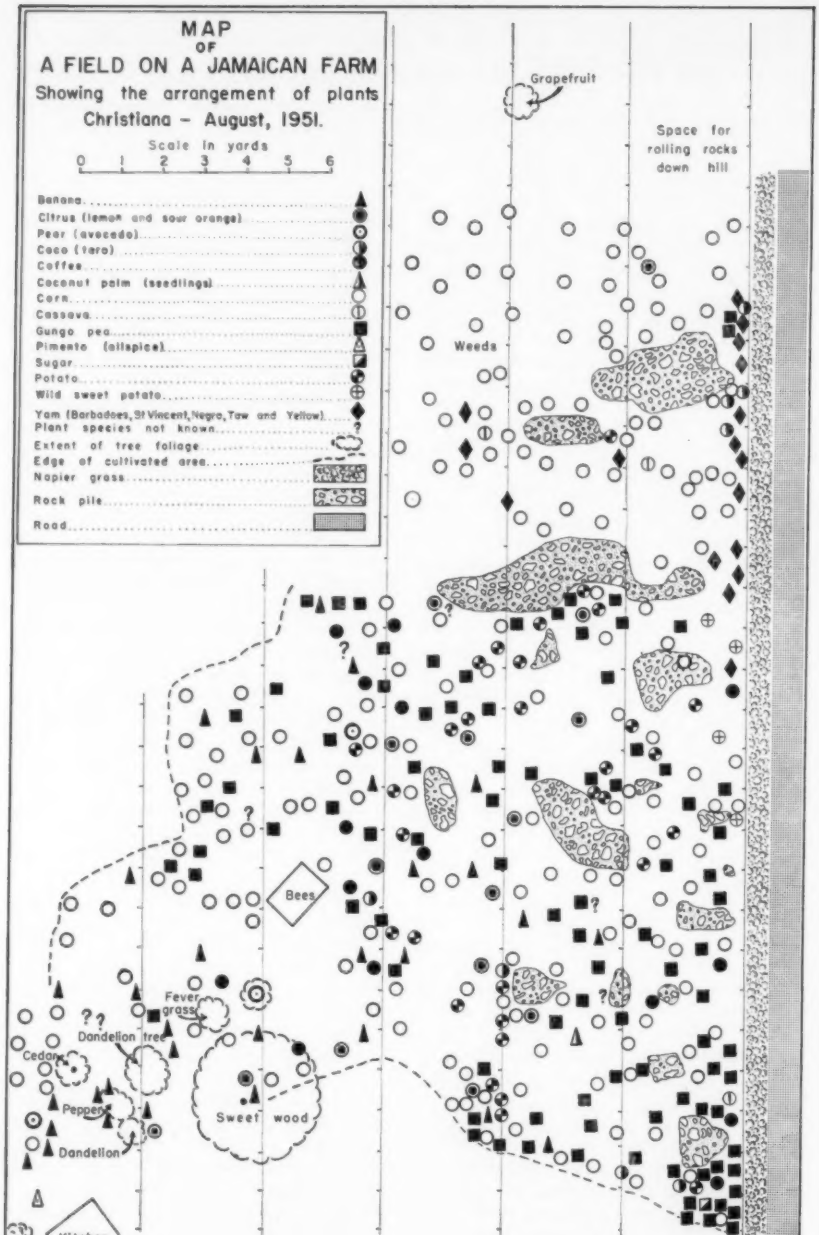
MAP
OF
A FIELD ON A JAMAICAN FARM
Showing the arrangement of plants
Christiana – August, 1951.
Scale in yards
0 1 2 3 4 5 6
Banana
Citrus (lemon and sour orange)
Pear (avocado)
Coco (taro)
Coffee
Coconut palm (seedlings)
Corn
Cassava
Gungo pea
Pimento (allspice)
Sugar
Potato
Wild sweet potato
Yam (Barbadoes, St Vincent, Negro, Taw and Yellow)
Plant species not known
Extent of tree foliage
Edge of cultivated area
Napier grass
Rock pile
Road
Grapefruit
Space for rolling rocks down hill
Weeds
Bees
Fever grass
Dandelion tree
Cedar
Pepper
Dandelion
Sweet wood
Kitchen

FIGURE 1

more per acre if each plant grows alone. Though it is true that bigger fruits of higher export value can be produced in this way, peasants maintain that the total yield per acre is not as great as the total yield from a field of mixed plants.

Some of the peasant and scientific reasons for this sort of planting will be pointed out, after an examination of another area of peasant planting. A valley runs along the centre of this second area (Figure 2). The soil here is blacker and thicker than on the valley sides, from which much of it has been removed by erosion. This area is used to grow bananas as they require the best soil. The bananas are at all stages of growth, because the peasant employs a continuous harvest and planting system. Twenty-five–foot Gros Michel banana plants with bunches ready to harvest grow among smaller and younger plants, and in some cases suckers are ready to replace the parent banana plant when it is cut down. Coffee is a perennial bush, but taya and coco (two kinds of taro) are also grown on the continuous harvest system. Cassava, yams, and sweet potatoes are less important rotating crops. The farmer plants, harvests, and weeds with his machete knife. The field is never clear of vegetation; individual plants can be harvested and planted without interfering with other crops. This method increases the rate of soil depletion, but reduces erosion and makes possible hillside farming among rocks where farm machinery could not work in any case.

On one side of the valley in 1951, this peasant was growing beans and ginger on the simultaneous harvest system. In the bean field all the bean plants were the same age, having been planted in the rainy season. They would all be harvested at the same time, as would the ginger. It will be noted, however, that even in these European-like fields the Jamaican peasant practises multiple land use. He tries to get extra produce from the bean field by putting in bananas, taro, coffee, corn, yams, and sweet potatoes. A peasant explained that this must be done, for one crop pays the rent while the others provide something for the peasant.

Plant mixing in a field seems to have several beneficial effects, from which it would appear that peasant agriculture is quite efficient. In a field with only one crop plant diseases spread easily and rapidly, as happened, for example, with rubber trees in Brazil, bananas in Jamaica, and peanuts in Tanganyika. When plants of one species are widely spaced with other plants between them, disease spreads less easily. This is true in natural tropical jungles and in much peasant agriculture: it explains why Jamaican peasants remain the principal banana growers of the island.

Different species of plants have different nutrient requirements. Beans and potatoes grown alternately in each row are a common and clear example of this in Jamaica. Different species may also have complementary requirements for shade and moisture; with lessened competition there can be greater total production than if only one crop were grown. Trees are especially helpful in bringing up from considerable depths nutrient material, which is added to the soil as leaves drop off and decay. Probably the most important result of plant mixing is the insurance the peasant farmer has that all his crops will not fail him, through disease, bad weather, or depressed prices.

In considering the efficiency of this agriculture the rotation of fields must also be examined. Bananas with associated crops are usually grown in the same place indefinitely. Tree mulch and garbage from the kitchen keep the soil at a high level of fertility, benefiting both the bananas and the immovable coffee bushes which continue to bear for thirty years. Areas without bananas and coffee grow crops for about two years and are then used for pasture. The peasants believe that cattle reduce soil erosion by packing down the soil, while the manure increases soil fertility. Special tall grasses, such as Napier grass, are grown on other parts of the farm and carried to the cattle. Some farmers allow fallow fields to recuperate their fertility by letting brush grow on them for several years. However, most peasant farms are too small to permit this classic shifting cultivation method. Rocky hill-tops cannot be farmed but they are used as much as possible. Trees for yam poles are grown here, firewood and some lumber are produced, and hill-tops produce mulch for the cultivated land. Leafy branches cut from trees and bushes

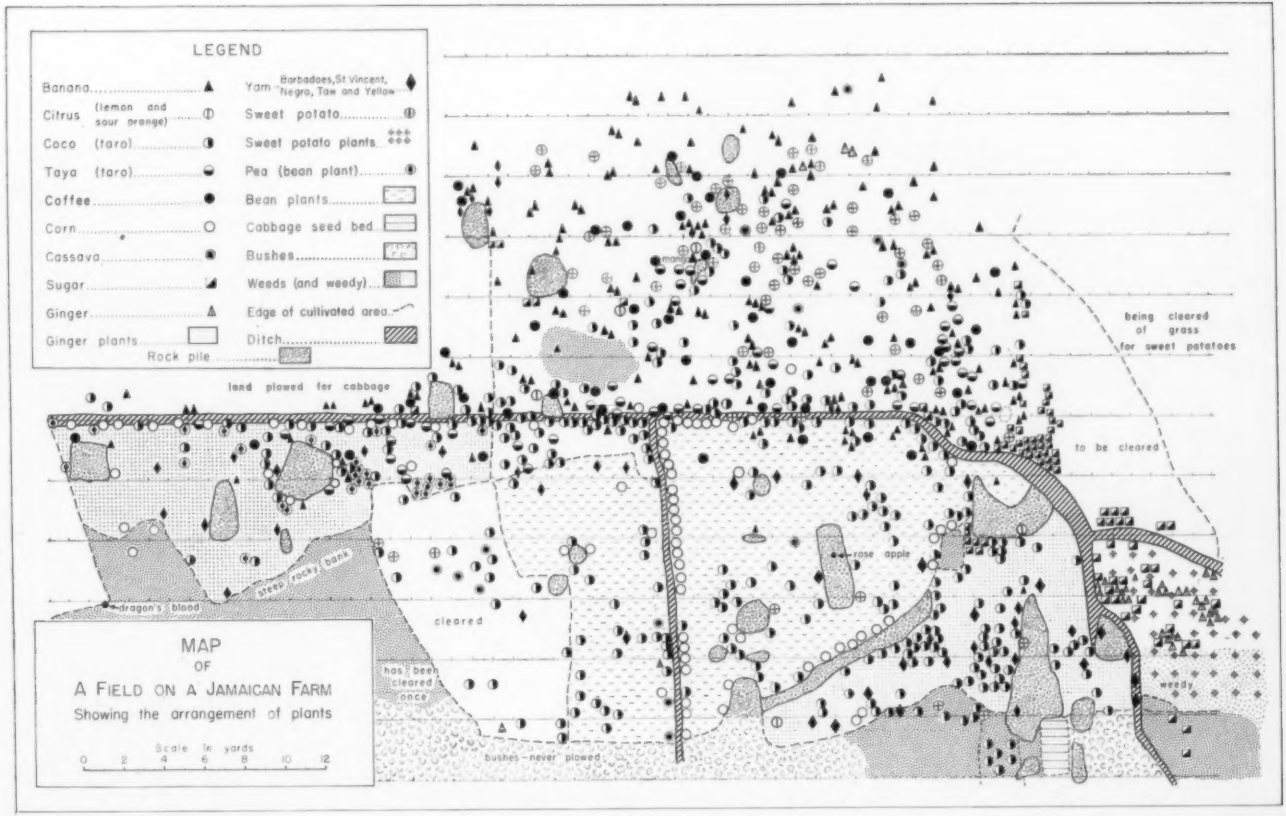

FIGURE 2

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are placed among the field plants. This transfers fertility from rough to smooth land, reduces erosion, controls weeds, and conserves moisture. Unfortunately, peasants in the area studied note that mulch is being used up faster than it grows.

There is evidence, such as the diminishing size of banana bunches, that soil fertility on peasant farms is decreasing. Fields which produced eight- and nine-hand bunches in 1945 produced five- and six-hand bunches of smaller bananas in 1955. How can this happen if peasant agriculture is efficient? Perhaps it is a result of this efficiency, which extracts nutrients from the soil quite rapidly. Soil fertility declines because the soil is depleted of nutrients more quickly than nutrients are replaced; but a less careful method of agriculture would deplete it even more quickly. Peasant agriculture does not succeed in preserving the level of soil fertility on which it depends, but it almost succeeds. If farms were larger, or if families were smaller, or if living standards were even lower than they are, then Jamaican peasant techniques might be able to keep soil fertility from declining. What, besides a change of attitude, could arrest this decline? Europeans who understand the situation recommend terraces, chemical fertilizers and sprays to combat disease. Rock and grass terraces are being built by peasants to slow down erosion, though they claim that the terraces are sources of fungus infection for plants. The government provides spray for Irish potatoes and bananas, though scarcity of water is often a problem. Peasants use very little fertilizer because it costs too much. Since most of the additional yield produced by fertilizers would be eaten by the peasant family, little money would be made to buy more fertilizer.

Peasants supply most of the food consumed in tropical countries and a large part of such export crops as cacao, rubber, and ginger. If peasant farming methods are based on sound scientific principles, empirically discovered, then science applied in the tropics will not produce the floods of new foodstuffs which are often spoken of. Peasant agriculture must be studied further, so that governments can encourage peasants to retain useful techniques, and perhaps some really helpful new ideas can be evolved.

FIGURE 2

RÉSUMÉ

On a souvent reproché à l'agriculture de subsistance des régions tropicales son manque d'efficacité, son caractère primitif et non-scientifique et son gaspillage.

Si l'on s'arrête à considérer certaines fermes de subsistance de Jamaïque, la distribution des champs et la répartition des cultures sur l'étendue des champs peut paraître purement fortuite. Certains champs sont couverts de broussailles ou de fourrés d'arbrisseaux, d'autres ont un tapis herbacé plutôt pauvre, où les mauvaises herbes foisonnent. Les sommets rocheux des collines portent très peu de grands arbres, mais une abondance de végétation ligneuse naine; dans les aires cultivées et les jardins, on peut voir ici et là une douzaine ou plus de plantes croissant ensemble, avec des éléments d'une espèce répandus parmi ceux d'autres espèces sur une partie ou sur toute l'étendue d'un champ.

L'auteur est d'avis que cette agriculture de subsistance est en fait très rationnelle. Les étendues couvertes de broussailles font partie d'un système de rotation qui assure la restauration de la fertilité du sol et sa protection contre l'érosion. Les aires herbeuses fournissent une pâture aux vaches et aux chèvres et la fertilité de leur sols est accrue par suite de l'apport de fourrages supplémentaires produits sur d'autres parties de la ferme. Les arbres ébranchés qui occupent les sommets rocheux des collines sont une source de matériaux servant à la confection de tapis protecteurs : on en coupe des branches feuillues et on dépose ces dernières entre les plantes qui poussent dans les champs. Cette pratique permet de transférer le peu de fertilité que possèdent les aires rocheuses au profit des terrains meubles, de diminuer la perte d'eau par évaporation, de prévenir l'érosion et de réduire la croissance des mauvaises herbes. Le mélange des plantes dans un champ donné tend à assurer une distribution plus égale de leurs besoins d'eau, d'ombre et d'éléments nutritifs. Dans ces conditions, les maladies propres à chaque espèce se propagent moins facilement et la présence d'arbres contribue à faire monter à la surface certains sucs nourriciers qui sont puisés en profondeur.

La pleine réalisation du degré d'efficacité qui caractérise cette agriculture de subsistance mène à une conclusion quelque peu pessimiste : l'application de connaissances scientifiques modernes à l'aménagement agricole de ces régions tropicales n'augmenterait que de peu la production de denrées alimentaires.

RECENT LAND DEVELOPMENTS IN COASTAL BRITISH GUIANA

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Carleton University

THE CARIBBEAN AREA has a land-hungry peasantry. Given this fact, it is understandable that the vast unoccupied expanses of British Guiana should be considered as a region of potential settlement. Nevertheless, informed civil servants, if not some politicians, recognize the limitations of the colony. The Robertson Commission in 1954 described the story of British Guiana as "one of unremitting and costly struggle against unfriendly natural surroundings; of much success, and some failure."[1] This statement applies to the coast, for the interior of the colony has invited hopeful comment rather than determined action over the past three centuries. A study of present-day land development along the coast points up the physical difficulties, and draws attention to cultural problems that add complexity to schemes of land settlement.

There are three distinct physiographic regions in coastal British Guiana: a lower coastal plain, a higher coastal plain, and an upland surface.[2] Deep deposits of sterile white sands of Pleistocene Age cover the upland surface, and limit economic interest to the bauxite deposits found at depth. The relatively infertile sediments of the high coastal plain do not warrant agricultural development. Accordingly, agriculture is limited in area to a narrow ribbon of land, two to fifteen miles in width, along the lower coastal plain (Figure 1), where recent sediments have been reclaimed from the sea.

The barriers to settlement are formidable, now as in the past. From the Corantyne River in the east to the Pomeroon River in the west, sections of the coast have been reclaimed by an elaborate system of sea defences. The mud flats of nature have been converted into productive agricultural land, lying as much as four feet below the level of the sea at high tide. Drainage has been provided by canals equipped with sluice gates or *kokers*, opened at low tide to permit flow to the sea. Irrigation canals have been interconnected with the drainage system to cope with the recurring problem of seasonal drought. Water is at the heart of the matter in British Guiana—salt water that must be held at bay behind the sea wall; surplus water from the humid tropical backlands that must be drained to the sea; and irrigation water that is needed during the dry seasons.

The ingenuity and labour of men have created this agricultural land of high productivity in coastal British Guiana. Dutch planters during the eighteenth century began the costly and difficult task of development of the lowland. One English author writing in 1840 did not consider the Dutch efforts at reclamation to be worthy of commendation. He wrote as follows:

> The original Dutch colonists seem to have sought in this country only another Holland. At an early period they set about gaining land from the sea, and accordingly planted themselves on the muddy lands of the seashore, where they had the comforting reflection, that they must necessarily be drowned by the sea on the one side, or by the bush water on the other, unless protected by dykes.[3]

Although this opinion may not have been widely held in 1840, it is significant that no major improvement of the coastal lowland was made by the British until after 1950. Eighteenth-century improvements on the land continue to pay dividends. These productive lands are a heritage from the days of slavery, when works of such magnitude could be undertaken with unpaid labour. Under slavery, the coastal lowland of British Guiana was developed more extensively than that of neighbouring Surinam and French Guiana, but not all of the suitable land was empoldered.[4] At the present time there is a return to large-scale development on the lower coastal plain of British Guiana. The contrast with the effort under slavery during

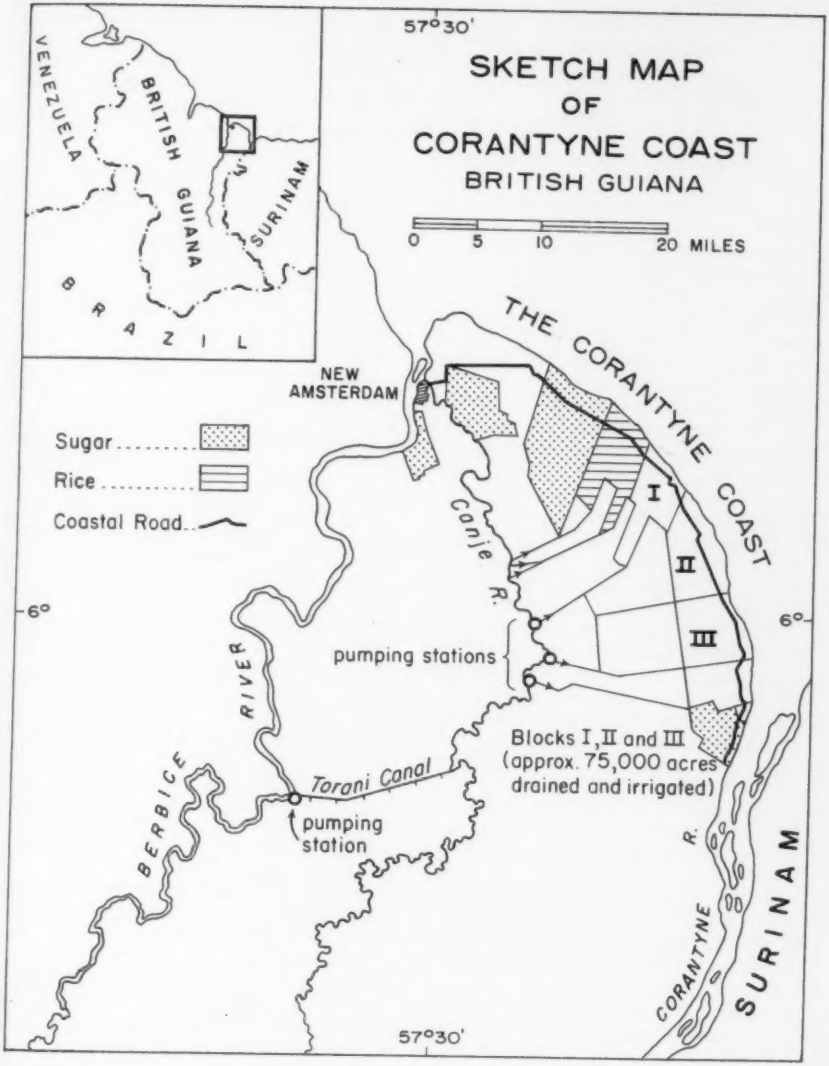
SKETCH MAP
OF
CORANTYNE COAST
BRITISH GUIANA
0 5 10 20 MILES
57°30'
VENEZUELA
BRITISH GUIANA
SURINAM
BRAZIL
THE CORANTYNE COAST
NEW AMSTERDAM
Sugar
Rice
Coastal Road
Canje R.
I
II
III
6°
pumping stations
BERBICE RIVER
Blocks I, II and III
(approx. 75,000 acres
drained and irrigated)
Torani Canal
pumping station
CORANTYNE R.
SURINAM
57°30'

FIGURE 1

the eighteenth century is sharp; today engineering skill and heavy capital investment develop land that is needed by a landless peasantry. There are four major settlement schemes in various stages of planning and development. Attention in this article will be focussed on the Corantyne Coast in general (Figure 1), and the Canje developments in particular (Figure 2).

The Corantyne Coast extends for some fifty miles between the Berbice and Corantyne rivers. The physical limitations of the district are typical of the coastal lowland. The tropical climate is best exemplified in the regime of temperature at New Amsterdam, at the mouth of the Berbice River, for the period 1930 to 1950: the mean annual temperature is 81.3°F, with an annual mean maximum of 88.3°F and an annual mean minimum of 74.7°F; the highest temperature recorded is 90.0°F and the lowest is 63.0°F. The mean annual rainfall amounts to 90 inches, distributed in four seasons. The "rainy season" occurs in April, May, June, and July. The four months of August, September, October, and November are known as the "big dry" season. The "little wet" occurs in December and January, and the "little dry" in February and March. There is some variation in the total amount of precipitation from year to year, and even more important, there is considerable variation in the seasons. In abnormal years one or the other of the short seasons may be entirely absent, and the failure of the "little wet" period means an abnormally long dry season, accompanied by a devastating drought. In summary, the humid tropical climate of coastal Guiana is neither excessively hot nor constantly humid. Thus the productivity of agriculture depends upon an adequate system of drainage and irrigation. The mud coast of British Guiana is a forbidding natural environment that invites development today only under the pressure of recent population growth.

The cultural environment of the Corantyne Coast is peculiar to the area. East Indians are the dominant racial group (and it is this area that consistently returns Dr. Cheddi Jagan to the Legislative Assembly in Georgetown where his Communist sympathies are a matter of concern to the Colonial Office). This is the "Wild Coast" of Jan Carew, a young Guianese novelist who is winning acclaim abroad. It is a landscape of contrasts; prosperous sugar estates, small rice plots, and salt marshes, costly estate buildings, modest homes, and hovels exist side by side. There is more and better peasant agriculture along this section of the coastal lowland than elsewhere in the colony. The East Indian villages are larger, better cared for, and more prosperous than their African counterparts along other parts of the coastal lowland. The physical presence of potentially productive swampland, and a landless peasantry with political power have resulted in two large-scale settlement projects involving control of Canje river water.

The Canje is the major source of irrigation water on the Corantyne Coast. It is a tributary of the Berbice River, and joins the latter far downstream at New Amsterdam. The Canje roughly parallels the coast, and thus is particularly useful as a source of irrigation water. Between Skeldon and Port Mourant sugar estates, some twenty miles of coastal lowland long remained undeveloped despite a high potential as agricultural land. The basic problem was shortage of water. For a long time it had been apparent that further withdrawals of Canje river water would result in the incursion of salt water at the mouth, with resultant ill effects to adjacent agricultural land. Under the pressure to create land for the peasantry, a scheme was adopted to supplement the flow of the Canje with water diverted from the Berbice far upstream by means of a cross-country canal. The land to be developed by this means was divided into Blocks I, II, and III (Figure 1). The plan provides for 47,000 acres of rice land, and 28,000 acres of improved pasture.

In 1953, after the Torani Canal had been built at a cost of over $2 million, and the drainage and irrigation works for an additional $2¼ million, Block III came into production.[5] Twenty thousand acres of rice land were opened up for settlement. The project has not been without its difficulties, as a quotation from an official report will show.

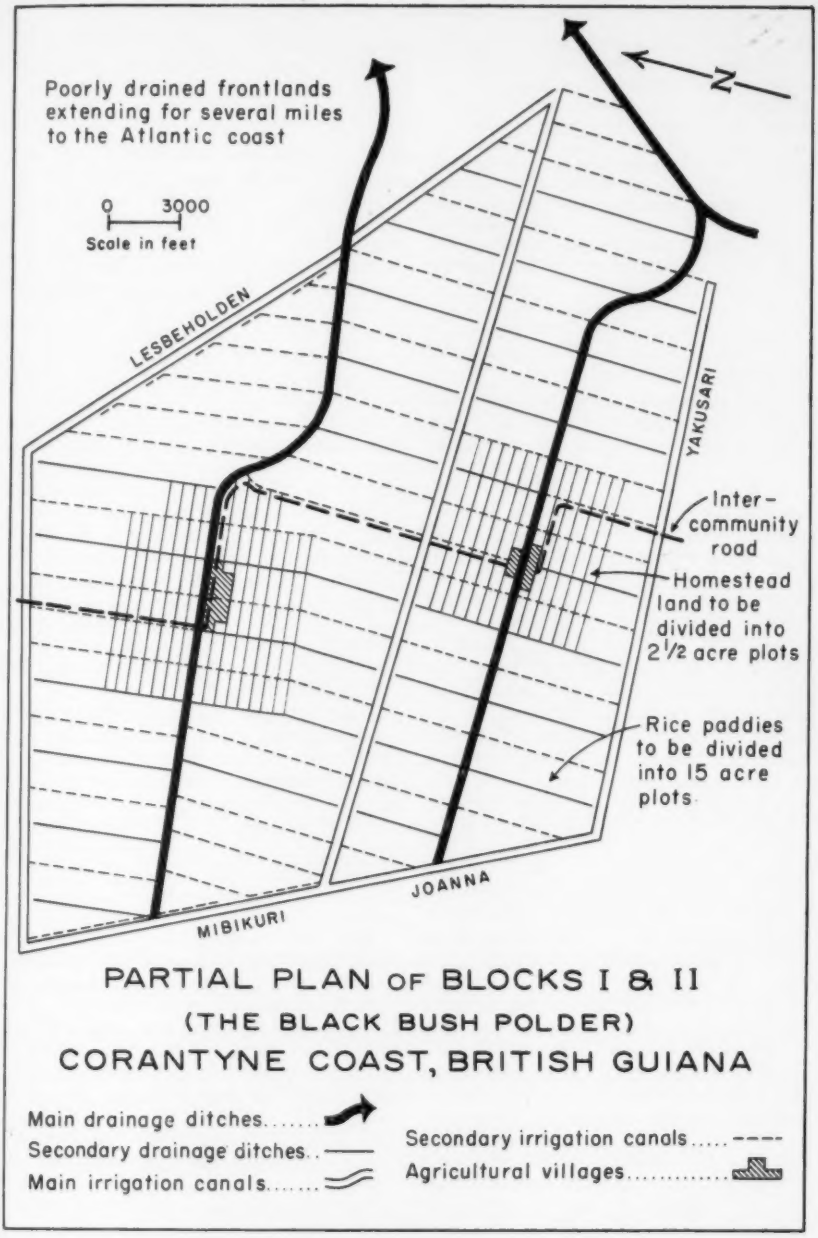
Poorly drained frontlands extending for several miles to the Atlantic coast
0 3000
Scale in feet
N
LESBEHOLDEN
YAKUSARI
Inter-community road
Homestead land to be divided into 2 1/2 acre plots
Rice paddies to be divided into 15 acre plots
JOANNA
MIBIKURI
PARTIAL PLAN OF BLOCKS I & II
(THE BLACK BUSH POLDER)
CORANTYNE COAST, BRITISH GUIANA
Main drainage ditches
Secondary drainage ditches
Main irrigation canals
Secondary irrigation canals
Agricultural villages

FIGURE 2

The Torani Canal is essentially a cut from the Berbice river to the Canje, and it was originally anticipated that water would be delivered from the Berbice during the dry season at all stages of the tide by gravity to the Canje river, and thus supplement its supplies and make possible the development of Blocks I, II, and III. However after surveys of the Torani Canal had been completed and construction commenced, it was found on further investigation that the levels in the two rivers would not permit of continuous operation by gravity.[6]

In blunt language, and some of it was used in British Guiana, at low tide the water in the canal flowed from the Canje to the Berbice, in accordance with gravity and contrary to engineering forecast. Regulators on the Torani Canal have since been built at a cost of almost $2 million.

A firm of consulting engineers from England is engaged in the present development of Blocks I and II, known as the Black Bush Polder (Figure 2). The contract involves the building of roads, bridges, and the engineering works that are required for land settlement. The scheme will create some 27,000 acres of rice land, complete with drainage and irrigation works, ready for planting. The cost of the project is estimated at $14 million, or over $500 per acre, independent of the cost of the Torani Canal. It is a well-planned project that involves four new communities located some few miles inland from the coastal road. Landless persons selected for the project will be granted fifteen acres of fertile rice land and two and a half acres of homestead land in one of the four central settlements. There is a question at the present time as to the eventual ownership of the land. Dr. Jagan and his party insist upon leasehold rather than freehold, presumably to make nationalization of the land more palatable at some future date. Politics and economics aside, it is a well-executed plan that calls forth much favourable comment. But whatever else it is, it is not cheap land.

There are sociological problems that do not yield to engineering skill and capital investment, powerful as these two factors are. The Corantyne Coast is one of the many regions in the Caribbean where for centuries the select few and the abject many have lived side by side in uneasy association. An unenlightened peasantry in British Guiana is suspicious of many attempts to improve living conditions, for the motive is not always understood.[7] This is particularly and emphatically true on the sugar estates where management is now willing to spend large sums for improved housing, community centres, playing fields, and the like for the workers. The community centres are little used by workers, who view the improvements as too good to be true and suspect an ulterior motive. A long history of exploitation is not readily forgotten. Even with a scheme as ideal as the Black Bush Polder, some well-informed Guianese anticipate difficulty in convincing a landless peasantry that taking up land in the new settlements will be to their advantage. To this observer, the deep interest of the East Indian in land of his own ensures a surplus of applicants for the land. But it is noteworthy that the East Indians deplore the isolation of the new communities only several miles inland from the coastal road and the older villages. There is little pioneering spirit to be found along the Corantyne Coast, and, indeed, in British Guiana as a whole.

It is significant that in a colony looked upon by many people as an outlet for the population pressure of the West Indies, land development is hard pressed to keep up with the needs of the Guianese, and only at great expense. The basic reason behind the present land development in British Guiana is the success of the anti-malarial campaign since 1945, and the resultant increase in population.

For centuries the Guianas had an infamous reputation because of malaria. The breeding places of the malarial mosquito, *Anopheles darlingi*, were almost exclusively man-made: irrigation canals, drainage ditches, rice paddies, and cane fields in flood fallow. Villages close to such water surfaces were intensely malarial; settlements relatively distant were nearly free from the disease. Many Guianese will recall with a wry smile the sale prior to 1945 of quinine at a few pennies per dose in the post offices throughout the colony. The widespread infection of the Guianese required the use of such outlets of sale. It

also required over the centuries that population be maintained by immigration into the colony. Small wonder that the myth of vast expanses of potential land for settlement, and the myth of great wealth in the interior, gathered strength. There was no pressing need to give the acid test to the claims. The Guianese remained on the coastal lowland, and British Guiana retained the myth of El Dorado.

The success of the anti-malarial campaign on the coast has brought the need for more schools, more jobs, and more land for a population that is dependent upon agriculture. The rate of annual population growth has jumped from 1.5 per cent in 1945 to 3.2 per cent in 1957. The population of British Guiana today exceeds 555,000. Ninety-six per cent of the Guianese live on the narrow lower coastal plain, 270 miles long and up to 15 miles wide. The decision to improve the undeveloped parts of the coastal lowland at high cost is convincing evidence that good agricultural land is scarce in the colony. This fact deserves wider recognition in the Caribbean area.

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RÉSUMÉ

Les terres productives du littoral de la Guyane anglaise sont un héritage du passé, alors que l'esclavage fournissait une main-d'œuvre abondante et peu dispendieuse permettant d'effectuer l'endiguement des bas-fonds. Les obstacles d'ordre physique qu'il fallut surmonter étaient formidables : il s'agissait non seulement d'éloigner les eaux marines, mais aussi d'assurer le drainage des basses-terres et leur irrigation durant la saison sèche.

L'extension du domaine arable se poursuit encore au vingtième siècle pour répondre aux besoins d'une population toujours croissante. Les problèmes n'ont pas changé, mais on a trouvé de nouvelles méthodes de les résoudre. L'habile technique des ingénieurs permet l'endiguement de milliers d'acres représentant un potentiel de production agricole énorme. Le travail peut se faire rapidement, mais non sans de forts déboursés. Ces conquêtes contemporaines sur la mer créent des problèmes d'ordre humain qui sont relativement nouveaux et méritent d'être reconnus et étudiés.

THE INTERIOR OF BRITISH GUIANA AND THE MYTH OF EL DORADO

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IN THE YEARS since European man first arrived in tropical America the interior of British Guiana has received a considerable amount of attention, for an area that remains today so sparsely populated and largely unproductive. The attention received from explorers, naturalists, writers, British Colonial Office officials, anthropologists, balata collectors, timbermen, gold seekers, and more recently British Guianese and West Indian politicians has largely been due to the persistence, in one form or another, of the myth of El Dorado.

The myth of El Dorado arose during the first few decades after the arrival of the Spaniards in South America. El Dorado, originally fact not fiction, took the form of an Indian chief, who, with body smeared in turpentine and gold dust, sailed to the centre of a lake, near the modern city of Bogota, to sacrifice gold offerings. El Dorado ultimately became an empire infinitely rich in gold and silver mines. Its location gradually migrated from the high Andes to the upper Orinoco, finally coming to rest in Lake Amuku, Rupununi District, southern British Guiana.[1] Sir Walter Raleigh had said of El Dorado: ". . . I haue beene assured by such of the Spanyardes as haue seene Manoa the emperiall Citie of Guiana, which the Spanyardes cal el Dorado, that for the greatnes for the riches and for the excellente seate, it farre exceedeth any of the world, at least of so much of the world as is knowen to the Spanish nation."[2]

For the last century and a half, though the search for gold and diamonds keeps several thousand men in the interior of British Guiana, the object of the myth of El Dorado has primarily taken the form of inexhaustible soils and unlimited forest resources. In 1834 a colonial office official in reporting home, made the following statement:

> It may with safety be affirmed that British Guiana contains many more acres of land than Great Britain and Ireland united, and it is a far more valuable possession than Mexico and Peru with all their gold and silver mines. . . . The soil in Guiana is inexhaustible both as to quality and quantity and as regards cultivation and colonisation its limits are literally boundless. If cultivation and colonisation proceed here and advance as they ought to do, it would matter little (in so far as sugar, rum, molasses and coffee are concerned) a few years hence, though all the islands of the Caribbean Sea were sunk to the bottom of the deep, British Guiana could furnish supplies for the whole world and even then have fresh soil to cultivate.[3]

The inexhaustible soil myth, of course, was quite widespread at the time and was applied to many tropical rain-forest regions. A luxuriant tropical rain-forest cover provided a false index of the fertility of the soil.

This misconception survives to the present day. It has long been thought by many that the interior of British Guiana, both forest land and savanna, offered considerable potentialities for settlement. In a Governor's Memorandum of 1928, it was claimed that "British Guiana has the unenviable reputation of being far less developed than any other country in the Empire, possessing equal advantages of natural resources, climate, and geographical situation. The nature of the external trade reveals the fact that British Guiana is not pulling its weight in the Empire. Nor is it playing the part which it should in the modern world, where the demand, both for an outlet for congested popula-

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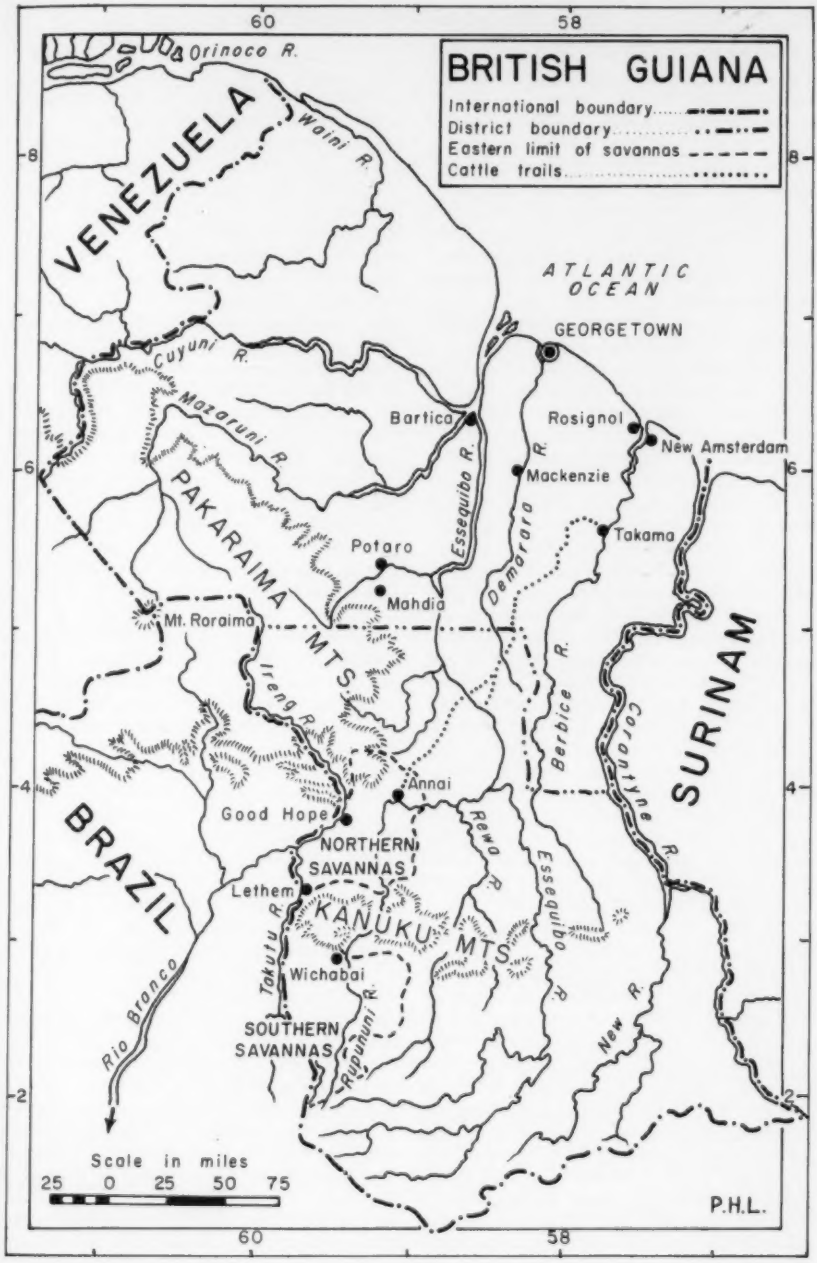
BRITISH GUIANA
International boundary
District boundary
Eastern limit of savannas
Cattle trails
60
58
8
6
4
2
Orinoco R.
VENEZUELA
Waini R.
ATLANTIC OCEAN
GEORGETOWN
Cuyuni R.
Mazaruni R.
Bartica
Rosignol
New Amsterdam
Mackenzie
Demerara R.
Essequibo R.
Takama
PAKARAIMA MTS.
Potaro
Mahdia
Mt. Roraima
Ireng R.
Berbice R.
Corentyne R.
SURINAM
Annai
Good Hope
BRAZIL
NORTHERN SAVANNAS
Rewa R.
Lethem
KANUKU MTS.
Takutu R.
Wichabai
Essequibo R.
Rio Branco
SOUTHERN SAVANNAS
Rupununi R.
New R.
Scale in miles
25 0 25 50 75
P.H.L.

FIGURE 1

tions and the tropical raw products required by manufacturing industries is increasing every year."[4]

To the present day, Guianese politicians, as well as West Indian politicians and economists, frequently look to the interior of British Guiana as the panacea for problems arising out of rapidly increasing populations, limited land area in the case of the West Indies Federation, and limited cultivable area in the case of British Guiana.

During a period of nearly four centuries, no individual or official commission entering the interior has brought out convincing evidence of an El Dorado in any shape or form, with the exception of the now famous bauxite deposits at MacKenzie which are however only 60 miles from the coastline. In the search for an El Dorado in the interior, it is the general opinion that fortunes have been lost and government money wasted. Less than two years ago a senior Colonial Office employee stated in London that the most useful contribution a geographer could make to the future development of British Guiana would be to explode the myth of El Dorado, once and for all. This official undoubtedly had in mind the undue attention that has been given to the development of the interior, and current plans which call for the construction of an extremely costly road into the Rupununi savannas, in spite of the fact that numerous commissions and more recently geological and soil surveys have reported on the limited potentialities for settlement and mining development.

In the expansion of the frontier of Western Europe across the vast territories of the New World, myth has frequently influenced the progress and direction of settlement. The myth of the Great American desert kept the farmer out of the Great Plains for almost half a century and brought the camel from North Africa to North America. In Brazil the myth of the sertão has promised wealth for several centuries and is today partly responsible for the movement of the Federal District to the interior, to a region which does not have obvious potentialities. The existence of a myth may thus unnecessarily delay frontier expansion or it may cause undue attention to be given to an undeveloped and sparsely populated region.

During the first half of the nineteenth century two German naturalists did their best to explode at least one form of the myth of El Dorado. First Alexander von Humboldt[5] in his travels in the "equinoctial" regions of the New World, and later the Schomburgk brothers[6] in their more intensive investigation of the interior of British Guiana, at least proved that the mythical city of Manoa did not exist, and they discovered little evidence of agricultural potentialities. Richard Schomburgk has also left us magnificent descriptions of the Rupununi savannas and of the influence of fire upon them. He reports the use of fire by the Indians to drive deer from the high grass; the rapid sweep of the fire across level plains and up steep slopes to the forest edge; and the rapid regeneration of the savanna foliage after the fire had passed and rain had fallen.[7]

Many others, scientists and non-scientists, entered the interior during the ensuing sixty to seventy years and in the course of either written or verbal reports commented upon the limitations of the interior for permanent settlement. Unfortunately there were others who perhaps observed only the first flush crop after a forest burn, or the lush green of the savanna towards the end of the rainy season, and who evidently did not observe the almost fleshless, bony breed that passed as cattle. These travellers were sufficiently numerous and vocal, and so the myth of El Dorado lingered on.

The first official investigation of the interior was undertaken by Nicolas Hortsmann on behalf of the Dutch Governor, Laurens Storm van's Gravesande, during the period 1740 to 1749.[8] Hortsmann, on reaching the Rupununi, settled down for some time with the Portuguese, who were by now using the region as a vast cattle ranch. Though the reports from Hortsmann were not encouraging, Gravesande in 1750 proposed colonization of the Rupununi "at first with not too large a number, one at a time twenty to twenty-five families would be enough at first, and when these have been there for three years and were able to teach and help others we might go on with larger numbers."[9]

Nothing materialized from these high hopes.

In this century, the first official investigation was not carried out until 1934.[10] The delay was primarily due to the fact that the frontiers of British Guiana together with those of Venezuela and Brazil were for many years in dispute and the process of defining them by treaty and demarcating them on the ground was not completed until 1939. By 1932, however, the retention of the Rupununi District by British Guiana was assured.[11] Two years later the British Government invited the League of Nations to appoint a Commission to report on the possibility of settling certain Assyrians in the Rupununi District. The Commission reported that Assyrians should be able to maintain themselves by subsistence farming in small holdings, coupled with grazing rights, but pointed out the lack of accurate knowledge of the agricultural possibilities of the savannas and recommended investigation of the problems involved. No developments followed this report.

In 1939 the British government again offered land in the interior, this time for Jewish settlement. A joint American-British Refugee Commission was appointed by President Roosevelt to study and report on the suitability and practicability of large scale colonization in British Giuana.[12] The Commission reported that two areas, one in the northwest district, the other in the Rupununi, contained certain soils apparently suitable for permanent agriculture, and a climate to which people of central Europe should be able to adapt themselves. They therefore recommended the founding of trial settlements of 3,000 to 5,000 people; and added that research and experiments should be directed at soil surveys and cognate matters. The war interrupted any further action.

This latter recommendation foreshadowed the procedure followed in the now famous British East African Groundnut Scheme. Settlements of 3,000 to 5,000 people could not really be considered as small. There was no sound evidence that this many people could be supported by agriculture, nor any combination of economic activities, within the Rupununi District. On the basis of the association of deep chocolate-coloured soils with a relatively rare palm, *Orbignya sagotii*, and several flourishing Indian fields, the commission concluded that there was sufficient good agricultural land to support settlement on the above scale. Vegetation indicators of soil type can often be misleading, and in addition the extent of the *Orbignya sagotii* had been estimated largely on the basis of brief visual impressions gained while flying over the forest areas adjacent to the savannas.

Up to this stage, settlement of the interior had largely been thought of in terms of peoples from outside the Caribbean area. For the first time at West Indian conferences in 1944 and 1946, resolutions were passed to the effect that the settlement potentialities of the British, Dutch, and French Guianas should be investigated.[13] A year later the British Guiana and British Honduras Settlement Commission was appointed. The Commission met between August 16 and December 20, 1947. Of this period they spent only nine days in the Rupununi District, but no doubt during hearings in Georgetown they learned more about the potentialities of the region, though of course at second hand. The following conclusions of the Commission must be considered in light of the limited nature of their investigation. The first statement applies to British Guiana and British Honduras, the remainder to the Rupununi District.

(1) Settlement in British Guiana and British Honduras is possible but only through vigorous development of their latent resources. Given this we believe that between them the two Colonies should be able over say, ten years to absorb 100,000 men, women and children.

(2) Settlement in the Rupununi–Kanuku area depends entirely on the provision of access by road. The total requirement of roads . . . would amount to some 330 miles, namely: Bartica-Potaro-Mahdia (115 miles); Mahdia-Rupununi savannahs west of Annai (115 miles); extension to a "nerve-centre" in the savannahs (100 miles).

(3) There is little scope for immigrant settlement on the open savannahs, but the establishment of an abattoir, refrigerating plant and possibly canning plant, and the

import of fencing material and fertilisers combined with certain investigations, are recommended in order to increase the Colony's food supplies by increasing the beef output of existing ranches.

(4) Settlement, including that of Europeans, is possible on the fringes of the Kanuku mountains. It would be based initially on pigs and poultry with tree crops such as coffee, cocoa, citrus and possibly tung being introduced later if trials were satisfactory. A trial settlement of about 200 families would be an essential first step. The full extent of suitable land is not known but could be established reasonably quickly by surveys; the indications are that there should be room for at least 5,000 families or 20,000 people. Initial settlement should be communal, though individuals might branch out on their own later. European settlement would not conflict with the interests of the Amerindians and would indeed benefit the area.[14]

Since the above recommendations were made, developments of a limited nature have occurred, though they must not all be attributed directly to the 1948 report. Major steps have been taken in order to increase both the production and quality of beef. Several specialists have advised on grassland management, improved cattle breeds have been introduced into the region, and fencing has been increased, though 200 miles of this resulted from the need for a control-fence parallelling the border with Brazil, following the outbreak of the foot-and-mouth disease in that country in 1954.

The latest stage in the investigation of the interior has taken the form of a series of soil and land-use surveys. This is the first investigation that could be considered as essentially scientific in nature. The results of the surveys have been published in a series of monographs by the Regional Research Centre of the British Caribbean.[15] These surveys followed a preliminary reconnaissance of a large section of British Guiana. Guided primarily by the geological map, six areas were selected for more detailed examination. The results from the point of view of future agricultural settlement were not bright. The monographs published emphasize that the underlying rock of the greater part of British Guiana is predominantly acidic and that the soil parent materials derived from these rocks are necessarily low in plant nutrients. In addition, because of the high annual rainfall and high mean temperatures, rock weathering, soil formation, and soil degradation are very rapid. Since the Guiana Shield is one of the oldest geological formations on the earth, the above two factors have been effective over an extremely long period of time. In only two areas of British Guiana are there exceptions to the above conditions. These are the coastal sediments, which are already densely settled, and small outliers of basic rock in central British Guiana upon which relatively fertile soils have developed. However in the first case, because drainage and irrigation control are necessary, development is extremely expensive, while in the second case, though these soils are now fertile, highly skilful management will be necessary to maintain the present level of fertility. No evidence was found of sufficient soil fertility to support agricultural settlements of the proportions suggested by the commissions of the 1930's and 1940's.

THE RUPUNUNI AND ITS PROSPECTS

From the time of the earliest search for the mythical city of "Manoa" in the general area of southern British Guiana, the Rupununi District has been the focus of much of the attention given the interior of British Guiana. There is no doubt that this attention has primarily been due to the existence of an extensive area of savanna, which provides a welcome break in the dense tropical rain forest which otherwise reigns supreme from the shores of the Caribbean to the southern limits of the Amazon basin, a latitudinal range of 20 degrees. The Rupununi savannas first became known to European civilization through the efforts of Portuguese settlers, who during the seventeenth century penetrated the Amazon basin and a number of its major tributaries. One of the latter, the Rio Branco, led them to an extensive area of savanna of which the Rupununi savannas are merely an appendage.

The Rupununi District lies to the south of 5° N. and between the Essequibo River and the Brazilian border. The savannas are restricted to the southwest corner of

FIGURE 2. Rupununi Settlement, Annai. In the foreground, a lateritic ridge provides a suitable site for settlement, above the low-lying, poorly drained savanna. On the right beyond the village is the airstrip. Dry weather cattle trails and roads criss-cross the savanna. In the background the forested slopes of the Guiana Highlands.

the district and are divided into the Northern and Southern Savannas by the Kanuku Mountains. The two areas combined total approximately 5,000 square miles.

Flying south-southwest from Georgetown across the almost featureless, forest-covered coastal lowland and then the Pakaraima Mountains, which, to the north of the Rupununi, average 4,000 to 5,000 feet in elevation, the descent to the Northern Savannas is sudden and most dramatic. The dark green of the rain forest and the steep slopes of the Pakaraimas give way with striking abruptness to a dominantly grassy savanna cover and a flat to undulating plain which averages only 350 feet above sea-level. The broad sweep of the savanna is broken only by the galeria forest of the drainage channels, isolated bush islands, and the fringing palms of swampy depressions. The rain forest takes over again with a suddenness that is difficult to explain in purely climatic, pedological, or edaphic terms. Man, his fire, and grazing animals have no doubt been the accompaniment of the plain and have helped to restrict the forest largely to the mountain slopes (Figure 2). The Kanuku Mountains rise abruptly from the savanna surface to an average elevation of 3,000 feet. To the south, the Southern Savannas extend to within 2° of the equator. Extensive plains give way to a gently rolling relief and occasionally to inselberg-type landforms. The latter, which are largely confined to the northwestern section of the Southern Savannas primarily take the form of small, usually rounded and forested hills.

The greater part of the Rupununi is drained by the river of that name, which is a tributary of the Essequibo. The remainder of the region towards the Brazilian border is drained by the Takatu River, a tributary of the Rio Branco, and by the Ireng which flows into the Takatu. With the exception of the Kanuku Mountains the region is an extremely low-lying divide

between the Essequibo and the Amazon and is characterized by sluggish drainage. An intricate pattern of swampy sites, old meanders, and oxbows all indicate the senile nature of the landscape.

Geologically the Rupununi is a part of the crystalline Guiana Shield, which is occupied by extremely old basement rocks or the detrital products from these. Soils produced from these rocks are in general very poor in trace elements. This may be because the rocks now exposed at the surface of the earth were formed at very great depths in the earth's crust, or because differentiation of minerals was less advanced.[16] The Southern Savannas are underlain primarily by crystalline basement rocks while the Northern Savannas are underlain by sediments derived from them. Basement and sediments alike yield very poor soils. Soil profiles now exposed are extremely leached and intensively weathered. Development of clay in the subsoil is slight and moisture-retention properties are low. The latter quality is particularly marked in what would appear to be an elevated relic erosion surface, near Lethem. This ridge-plateau formation extending north from the Kanukus is characterized by iron-stone concretions and vesicular material overlying a considerable depth of sand.

There are four main types of vegetation in the Rupununi District. Most of the mountainous areas, at least on their lower slopes, carry a dense cover of rain forest in which there occasionally occur almost pure stands of purple heart, an extremely valuable timber tree. These forests also contribute to the supply of balata which has in the past, been tapped on a widespread scale from the bulletwood tree (*Mimusops bidentata*). The rain forest merges into a fringing forest of the semi-deciduous variety. A similar type of forest occupies most of the bush islands in the savanna (Figure 3). Second-growth associations tend to predominate over climax forms because of the extensive practice of shifting cultivation.

FIGURE 3. Northern Savannas. Parkland-type savanna, lush in appearance but unpalatable to the tongue and lacking in nutrition. The pasture here is of higher quality than most of the Rupununi savanna, which has an average carrying capacity of only about one head of cattle to an acre.

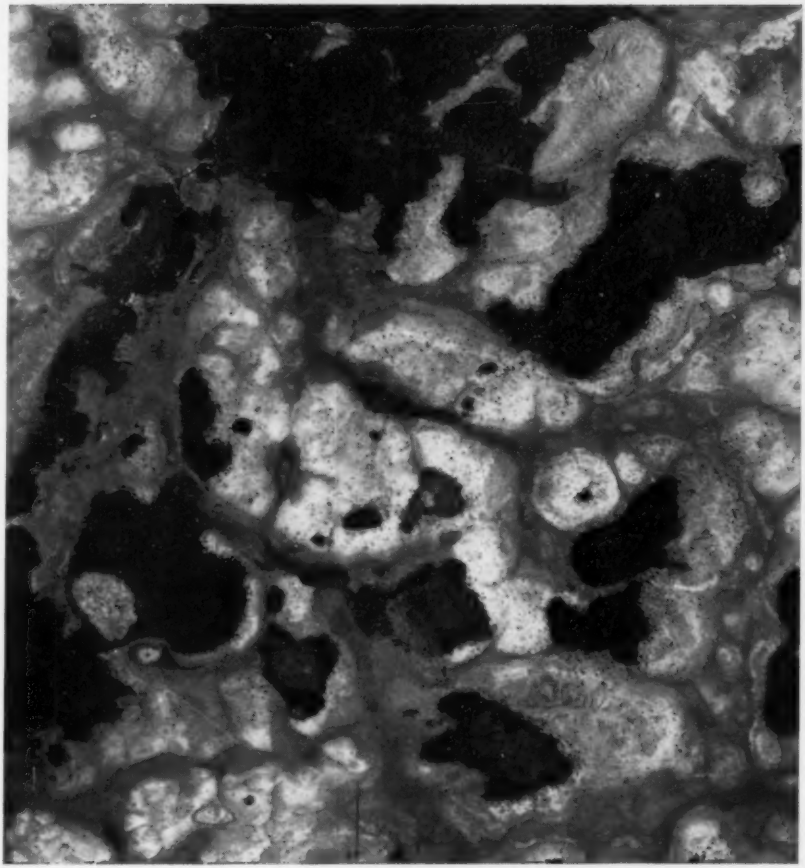

FIGURE 4. Savanna-Bush Island Landscape, Rupununi District, British Guiana. This airphoto, taken at an elevation of 15,000 feet, illustrates various physical and cultural features of the Rupununi savannas. It is suggested that the entire area of the photo was at one time forested. The forest remains now only in galeria and bush-island form. In this area of shifting cultivation, burning and cultivation practices have probably induced ecologically dry conditions which have prevented the regeneration of the forest vegetation. This process is illustrated in the larger bush island to the left, where a patch of savanna has developed. In the smaller bush islands forest regeneration has started, but, because of a regional lowering of the water table, it is unlikely to progress very far. These bush islands will no doubt fall prey to savanna fires.

Photo Credit: Hunting Aerosurveys Ltd., and Lands and Survey Dept., B.G.

The savanna association is primarily of the open scrub or woodland type. Scrub density varies from open woodland formation (*campo sujo*) to almost pure grassland (*campo limpo*). The dense scrub formation, or the *campo cerrado* of the accepted Brazilian classification of savanna is almost completely absent. The fire-resistant, sand paper tree (*Curatella americana*) is the dominant scrub form,

while the dominant grass is *Trachypogon plumosus*. The latter grows alone on iron-stone ridges and white sand, while on brown sand uplands it is joined by other grasses. On lower ground where there is likely to be inundation during the rainy season, *Trachypogon* disappears and gives way to a very mixed cover which includes sedges and some low shrub forms. In the more extensive depressions or "baixas" the ground is occupied almost entirely by sedges. Flood water may stand in these areas to a depth of several feet for up to five months. In general the vegetation cover of the savannas lacks nutritive value and palatability.[17] The latter qualities are most likely to be present to a limited extent on alluvial flats and in those sections of depressions which dry out for a reasonable period each year (Figure 4).

The mean annual rainfall of the Rupununi savannas is probably about 65 inches though it may vary from the mean by as much as 30 per cent. The data in Table 1 illustrate the typical distribution.[18] Two-thirds or more of the total falls during a four-month period, usually between the end of April and the end of August. From 20 to 30 days of rain per month can be expected during the rainy period. The intensity of the rain is very high, so that in those areas where the savanna cover is sparse the soil structure is adversely affected. Air temperatures average about 83° F with but a slight seasonal variation. The diurnal range, 13° to 18° F, which is one of the most attractive features of the savanna climate, is high for a lowland location so close to the equator. High wind speeds in the four months following the rainy season help to dry out the inundated savannas but at the same time greatly reduce the effectiveness of the precipitation.

It is not the purpose of this paper to attempt an explanation of the origin of the savanna, but it is apparent that the savanna of the Rupununi is not a climatic climax, as suggested perhaps by the rain shadow effect of the Pakaraima Mountains, but rather an edaphic climax as suggested by Beard,[19] Loxton *et al.*,[20] and Hueck.[21] Loxton *et al.* state: "It is considered that the present rainfall pattern and associated soil moisture regime superimposed on the soil environmental factors of this resurrected surface essentially induce ecologically dry conditions." The impact of burning, grazing, and cultivation upon the origin and present distribution of the savanna is undoubtedly significant, but difficult to measure. It would appear, however, that cultivation practices as well as burning are causing the disappearance of certain bush islands and the retreat of the forest edge (see Figure 2). Insufficient is known about the extent and intensity of past human occupancy to appraise fully the influence of the biotic factor.

INHABITANTS AND LAND USE

The human population of the Rupununi is almost 5,000 and is made up largely of

TABLE 1

CLIMATIC DATA, RUPUNUNI DISTRICT

Total	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
					Rainfall (inches)							
Lethem (1955–9):												
61.40	.84	.60	1.04	3.66	11.23	14.66	11.30	9.09	3.04	2.16	2.95	.74
Annai (1950–9):												
64.52			Driest month mean .04 (Nov.)						Wettest month mean 14.73 (June)			
			Driest year (1958) 43.26						Wettest year (1954) 79.89			
Year					Temperature							
Lethem (1958–9),			Mean	max.,	Mean	min.:						
91.40	92.8	92.8	92.9	90.4	89.9	87.4	88.0	89.5	91.6	94.3	92.6	92.7
74.5	75.1	74.2	74.9	74.7	74.7	73.4	73.2	73.5	75.3	75.9	75.3	75.4

Amerindians of the Wapisiana and Makushi tribes. The total population is almost evenly divided between the Northern and Southern Savannas. The non-Indian population numbers approximately one hundred. This total comprises primarily the descendants of H. Melville, who was of Scotch and French descent, and his wife, who was Amerindian. The remainder are others of European origin, some coloured Guianese settlers from the coast, missionaries, and temporary government officials. The Amerindian practise shifting cultivation to raise such crops as maize, manioc, beans, rice, bananas, citrus, and tobacco; they graze cattle on their reservations, keep pigs and poultry, collect balata, work as vaqueros on the ranches and more recently as labourers in the abattoirs. Most of the cultivation is practised at the forest edge, in the bush islands, and in the galeria forests. Though the living conditions of the Amerindians have been raised, there has been little increase in their numbers and the problems arising out of the acculturation that has so far occurred are many and complex. Most of the Amerindians live on three large reservations, but an increasing number are now located around ranch headquarters, government posts, and other sites of economic activity. Though the Amerindian has found employment with the rancher, the two groups have come into conflict because of rival claims for rights of occupancy and grazing. The Amerindian has tended to move freely across the savanna, burn indiscriminately, overgraze with cattle, and slaughter the ranchers' cattle. The explanation for this behaviour is relatively simple. Grazing rights have been granted to the rancher under the Cattle Grazing Permission. One condition of the permission is that "it is subject to the right of Aboriginal Indians already established within the area comprised therein to continue to graze cattle thereon."[22] However very few Indians today could claim to be "already established" on a permission at the time it was first leased. The Amerindian has suffered loss in another respect. Mainly because of the establishment of ranches, there has been a decrease in the wild life of the savannas. The deer, at one time a prime source of food for the Amerindian, have been replaced by cattle. Schomburgk reports on the Indians using savanna fire to help them in their hunt for deer. The ranchers also at one time burned the savanna extensively, in order to increase temporarily its grazing quality and to reduce the number of ticks. But, with the realization that the carrying capacity of the savanna was being reduced by annual burning, the practice was outlawed by a ranchers' association. The Indians show no such restraint and smoky dry-season skies are not yet uncommon.

Cattle ranching is the mainstay of the Rupununi economy. Not only are people of European extraction largely dependent upon this industry for their livelihood, but also an increasing number of Amerindians. An average of 50,000 cattle are grazed on approximately 4,000 square miles, which means one head of cattle to 50 acres. However this figure does not mean much, for ranching is based upon the open range system and there are extensive areas which are grazed very infrequently, if at all. From 3,000 to 4,000 head of cattle are produced per year for market, but the average carcass is less than 400 pounds, which is a very low yield of beef (Figure 5). The carrying capacity of the range is largely determined by the extent, quality, and accessibility of the grazing immediately adjacent to swampy sites, as cattle are almost entirely restricted to such sites during the height of the dry season. This type of site occupies only about 10 per cent of the savanna.

Of the ten ranches on the Rupununi, only one is located in the Southern Savanna, this being the property of the Rupununi Development Company. Until recently all land has been held on an annual lease basis, not a practice to encourage permanent improvements of the land. The Rupununi Development Company now has a 21-year lease on 2,450 square miles of crown land, on which they graze about 30,000 cattle. The ranchers on the Northern Savanna are also beginning to obtain longer leases, one having obtained a 25-year lease on 100 square miles. The land is leased at the rate of $15.00 (B.W.I.) per year for a 50-square-mile block in the Northern Savannas, and $2.00 per year per square mile in the Southern Savannas.

The modern ranching period began with

FIGURE 5. Rupununi Cattle. The mixture of cattle in this yard represents over three centuries of cattle grazing in the Rupununi. The original cattle introduced via the Amazon from Portugal have been crossbred with English cattle breeds, such as the Hereford (the white face of which shows up in the foreground) and Indian Zebu breeds introduced from Brazil.

the completion of a cattle trail to the coast in 1920. Until that year the only market for Rupununi cattle had been in the Amazonian cities of Boa Vista and Manaos, but the demand had always been small and variable. The cattle trail extends 180 miles through dense rain forest, patches of savanna, swamp and rivers, from Annai to Takama on the Berbice River. From that point cattle travel by barge 63 miles to Rosignol and then by train 61 miles to Georgetown. The journey takes from 15 to 17 days, though for cattle from the Southern Savannas 25 days are required. The number of cattle reaching Georgetown via the trail average 1,750, compared with the number of carcases flown out which now average about 2,000 a season. Movement of cattle to market on the hoof still brings the rancher greater returns. In spite of the low freight charge, only 4¾ cents per pound on the basis of one-way charters and a full pay-load of 7,500 to 8,000 lbs., air transportation is only profitable while beef prices on the coast are high. However there is greater risk on the trail. Up to 40 out of 250 cattle have been lost as the result of a stampede caused by a jaguar; the average loss is, however, only one to 1½ per cent, and on the average cattle lose 20 lbs. weight during the journey. The aerial "meat-train" which is operated by the British Guiana Airway is quite heavily subsidized by the Government (Figure 6). The amount of the subsidy on beef transportation is somewhat difficult to calculate, but it can be appreciated from the fact that in other parts of the world air transportation accounts for up to 65 per cent of the meat value while in British Guiana the proportion is only 20 per cent. In addition, airfields have been constructed and are maintained by the Government, and the abattoir at Lethem was provided free of charge, with only a small fee for its use. The transportation of supplies, including material for the improvement of ranching such as fencing wire, fertilizer, and salt licks, is likewise subsidized.

FIGURE 6. Aerial "Meat Train." Amerindian labourers carry beef into a Dakota aircraft from the abattoir at Lethem. The beef will be on sale in the markets of Georgetown and other coastal cities by the following morning.

In spite of this assistance the rancher has found it extremely difficult to instigate the improvements he recognizes as so desirable. Large-scale financing is required if 50-square-mile blocks of land are to be appropriately fenced, if sufficient high quality bulls to up-grade such meagre herds are to be purchased and transported into the region, and if adequate salt and mineral supplements, fertilizer, improved grass seed, and other necessary supplies are to be purchased.

It would appear that if the Government of British Guiana recognizes increased beef production in the Rupununi as a national need, it will have to accept an even greater degree of responsibility, not only for financing but also for the initiative that will be necessary to break the vicious circle that now plagues the ranching community. There are members of the ranching community who would prefer to be left alone. Isolated for many decades in their forest clearing beyond the Pakaraimas, many of the ranching community, culturally at least, have more in common with the Brazilian communities across the border than with the coastal community of British Guiana. Many of them have never been to Georgetown, though they frequently visit Boa Vista and occasionally Manaos. The air age has brought closer connections with the coast and a quickening tempo of living, which is not always appreciated. The ranching society of the Rupununi is a vestige of the open range which was so extensive in the world's grasslands during the nineteenth century. Those who are a part of it love its freedom. There are two yearly round-ups, irregular drives to the abbatoirs and down the trail to Georgetown, some plantings and harvestings at the forest edge or in the bush islands, occasional entertainment of guests, and the swinging in the hammock at four to the accompaniment of a cup of tea. This all suggests a way of life and a pace of life that will not easily be changed (Figure 7). Perhaps at least the ranchers have found their El Dorado and they wish to guard it closely as it has always been guarded.

FIGURE 7. Rupununi Ranch. The thatched-roof, adobe-walled structure is typical of the ranches of the Rupununi.

At present as in the past it would appear that no El Dorado of the magnitude envisaged by Raleigh and more recently by some Guianese politicians exists in the interior of British Guiana. Mineral wealth may yet be proven, but no combination of cultivation and ranching and/or forestry is likely to support any considerable increase in the population of the Rupununi District or any other part of the interior in the near future.

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RÉSUMÉ

Il est assez étonnant qu'un employé de l'Office Britannique des Colonies ait pu déclarer en 1959 que la contribution la plus substantielle qu'un géographe puisse faire au développement de la Guyane anglaise serait d'anéantir le mythe de son Eldorado. La version initiale de ce mythe, celle de l'existence de vastes quantité d'or à l'intérieur de ce pays, fut mise au rancart par le naturaliste allemand Alexander Von Humboldt et par les frères Schomburgh au cours de la première moitié du dix-neuvième siècle. Un nouveau mythe a toutefois pris naissance : celui de la disponibilité, à l'intérieur du territoire, de ressources agricoles et forestières inépuisables. Ce mythe a survécu jusqu'à ce jour. Non seulement a-t-on formulé des plans pour la construction très dispendieuse d'une route de 300 milles vers l'intérieur, une région dont les traits géologiques et pédologiques sont à peine connus, mais, de plus, certains politiciens des Indes occidentales ont maintes fois déclaré au cours des années récentes que cette région pourrait recevoir le surcroît de population de la Fédération.

Durant les derniers cinquante ans, plusieurs commissions officielles ont mené enquête sur les possibilités qu'offrirait l'intérieur, au peuplement agricole. Dans tous les cas, la région de savane de Rupununi, située dans le sud-ouest de la Guyane anglaise, a constitué le point central des recherches. Les rapports de ces commissions, bien que basés uniquement sur les résultats d'enquêtes générales, soulignent unanimement que la possibilité d'établir un peuplement agricole relativement dense sur les étendues de savane et sur les sols forestiers adjacents est très limitée et que, par ailleurs, ni la construction d'une route ni celle d'une voie ferrée pour relier l'intérieur et la zone côtière ne sauraient être justifiées présentement.

Une nouvelle phase d'enquêtes plus intensives et plus scientifiques a débuté; ces recherches se limiteront toutefois à définir de façon plus précise les territoires qui pourraient être colonisés dans les circonstances économiques actuelles. On a estimé en 1948 que ces régions ne pourraient recevoir qu'environ 5,000 familles et que l'établissement de ces dernières devrait être réparti sur plusieurs dizaines d'années. Ce calcul est sans doute raisonnablement exact. Où diriger alors le surplus de population des zones côtières de la Guyane anglaise ? Et celui des Indes occidentales ?

THE WEST INDIES: A FEDERATION IN SEARCH OF A CAPITAL

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IN MODERN political federations choosing the site of a capital invariably arouses a great deal of controversy. What are sometimes regarded as two "essentials," centrality and political detachment, are often debated more in the heat of sentiment than the coolness of reason. Theoretically, a central location is desirable for a federal capital as it then lies equidistant from the more remote units of the federation and is more or less equally accessible. In practice, however, such centrality has seldom existed in either large or small federal states.[1] Neutrality, the second requirement for the federal capital, has been sought by practically all modern federations because it satisfies the desire for a capital neither too closely associated with nor unduly influenced by the traditions and interests of any one of the components. Thus a neutral capital has almost invariably implied a new town.

Centrality, applied to the West Indies Federation has little or no significance because of the curious sundering of the region and the distribution of its population. Arranged roughly in the shape of a triangle, with Jamaica, Trinidad, and St. Kitts-Antigua at the corners, all the islands of the Federation lie a little outside this triangle (Figure 1). None of the islands is geometrically central for

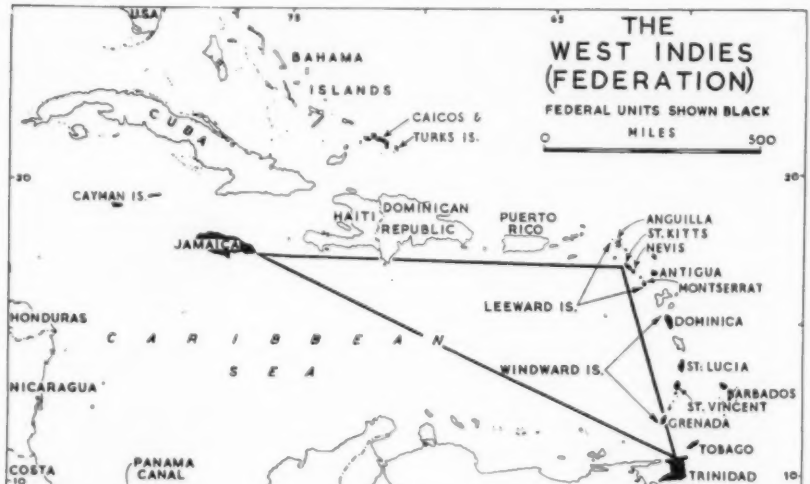

FIGURE 1

the whole Federation, nor is any central in a demographic sense. Table 1 shows that of the total population of the Federation, over half is in Jamaica and the rest is scattered throughout the other islands. Thus only Jamaica and Trinidad have an appreciable proportion of the total population. Clearly, there is no island that can meet the claim of centrality in either a physical or a demographic sense.

Like centrality, neutrality is a factor that bears little or no relevance to the problem of the location of the West Indies federal capital. The units are all small islands and the federal capital, placed in any one of them, even if remote from groups within that island, would almost certainly be influenced more by the interests of that particular island than by those of the others. Thus factors peculiar to the West Indies must be considered in the attempt to find a site that answers the needs of the region.

Factors governing the choice of an island for the federal capital would include adequate and available land suitable for building, an ample water supply, electricity, and proximity to an existing airport, since money is not available for the construction of another. In addition, proximity to an urban centre would offer the advantages of the general services and facilities associated with large towns. Finally, since the islands are by nature richly endowed with beautiful white beaches and scenic grandeur of which West Indians are justly proud, the capital ought really to be sited in one of the most beautiful parts of one of the islands as a stimulus to self-respect, dignity, and pride, attributes essential to the making of a nation.

TABLE 1

ESTIMATED TOTAL POPULATION (000)

	1956	1957	1958
Jamaica	1,564	1,608	1,651
Trinidad & Tobago	743	765	817
Barbados	228	232	237
Leeward Islands	122	127	130
Windward Islands	320	326	332
	2,977	3,058	3,167

LAND REQUIRED

Because of expanding population of the West Indies and the high number of unemployed, most of whom must eventually be settled on the land, and because of the restricted land space in the islands, the area of land to be chosen for the capital site should be limited. It is estimated that an area of about 28 square miles would be large enough for the urban administrative core and the surrounding suburbs that would make up the Federal District. This essential requirement envisages land that is not presently in use. Unquestionably a few square miles of land can be found in most of the islands, but few would have enough or could make it available without serious harm to their economy.

The acquisition of land for the capital site also presents grave difficulties since the islands are saddled with an archaic system of land tenure. This system reserves land for next of kin, or for those within a certain social group, so that its aquisition would involve fantastic prices. Of course, crown lands could easily be acquired but these are invariably hilly and forested. Clearing and building on these lands would raise the costs beyond the means of the Federation. Thus, as far as adequate and available land are concerned, Jamaica and Trinidad, by virtue of their relatively large extent, have more than the other islands, and have a corres-

pondingly stronger claim to house the federal capital.

PROXIMITY OF AVAILABLE LAND TO AN EXISTING TOWN

The proximity of land to an existing town is an essential requirement, partly because such a town could accommodate the federal administration—offices and staff—as well as the numerous construction workers and business men, and partly because it can provide the essential services during the period in which the capital is being built. The three largest towns of the West Indies are Kingston (Jamaica), Port of Spain (Trinidad), and Bridgetown (Barbados). Each of these enjoys the further advantage of having available land relatively near, expensive though it may be, to satisfy this requirement of the capital. Another advantage, which in some measure is absent or limited in other urban centres of the West Indies, is the availability of essential services, including electricity, telephones, good roads, and good water supply. In all of the smaller islands the surface relief exerts a strong detrimental influence on movement by road and communications in general. Thus the physical geography of Jamaica, Trinidad, and Barbados, among other factors, enables only these islands to meet the necessity of available land near an existing town, a conclusion arrived at by the British Caribbean Federation Capital Commission of June, 1956.

PROXIMITY TO AN AIRPORT

Although the Federation is peculiarly maritime, circulation by sea is inadequate, slow, and unsatisfactory, and, since the chief means of travel within the Federation is by aircraft, it is clear that the federal capital should be served by an airport. But the building of a new airport is unlikely. Thus the capital should be placed near an existing airport. It is true that all of the islands are served by the British West Indies Airways, but a traveller has only to land on these airfields to realize instantly that only those of the Palisadoes and Montego Bay of Jamaica, Piarco of Trinidad, Seawell of Barbados, and the American-built airfield of Antigua are worthy of consideration as major airports. Grenada's, St. Lucia's, and those under construction in St. Vincent and Dominica are too small to meet the needs of these islands let alone those of the seat of federal administration. Nor is there enough space on any of them for the type of extension that would be required. Thus, on this one consideration alone Jamaica, Trinidad, Barbados, and Antigua vie with one another, especially as the first three are improving their airport facilities.

CONTRIBUTION TO FEDERAL EXPENSES BY THE UNITS

A further factor which exerts a most powerful influence on the choice of site for the capital is the individual contribution of the federal units to the expenses of the Federal Government.

Table 2 shows that Jamaica is the largest contributor, followed by Trinidad and Tobago. One would surmise that this, above all other considerations, accords Jamaica the strongest claim, for, whether in local or international politics, those who contribute most to the common weal usually have the strongest voice.

The obvious conclusion is that the smaller islands lack the prerequisites of a federal capital because of their size, terrain, and economic limitations, and that the three largest islands of Jamaica, Trinidad, and Barbados would seem to have best claims by virtue of their size and other cardinal geographical factors. It was not surprising, therefore, that the decision of the British Caribbean Federal Capital Commission[2] coincided with this choice of islands, but their order of preference was: Barbados, Jamaica, Trinidad.

THE SELECTION OF THE ISLAND

Conscious of Trinidad's former unstable politics, the Commission put Trinidad third in their order of preference. First place went to Barbados because, it was believed, the intellectual atmosphere in Barbados was keener than in Jamaica, inter-island communication with Barbados better than with Jamaica, and because Barbados, smaller and with fewer potentialities than Jamaica, would, if developed, satisfy the aspirations of the islands of

TABLE 2

AMOUNT TO BE PAID BY THE GOVERNMENT OF EACH TERRITORY UNDER ARTICLE 93 OF THE CONSTITUTION

Territory		Proportion (per cent)
Jamaica		43.1119
Trinidad & Tobago		38.6252
Barbados		8.5562
Leewards:	Antigua	1.3374
	St. Kitts–Nevis–Anguilla	1.7256
	Montserrat	0.2732
Windwards:	Dominica	1.6250
	Grenada	1.6969
	St. Lucia	1.7400
	St. Vincent	1.3086

the eastern group with which she is in closer contact and of which she has better knowledge.

This recommendation was wholly unsatisfactory to West Indian Governments. Thus the appointment of the Capital Site Commission, while it aimed to give an impartial view—according to the Commission—of the claims of six islands (Jamaica, Trinidad, Barbados, Grenada, St. Lucia, and Antigua), appeared to be a waste of time, energy, and taxpayers' money. Yet, indirectly it decided the choice of site, in that it drove the West Indians to decide the matter themselves, independent of and in reaction to the findings of the Commission. The choice of island was Trinidad, and the choice of site within the island was Chaguaramas. This decision was subsequently written into the Constitution, and is now binding.

Trinidad's proximity to the other islands of the eastern group, as compared with Jamaica's, gives her a locational precedence over Jamaica but not over Barbados; her contribution to federal expenditure puts her claim ahead of Barbados's but not ahead of Jamaica's; her available land while not more than Jamaica's is more than Barbados's. Except for her proximity to the eastern islands which she shares equally with Barbados, her claims are not especially strong, including that of her developed mineral wealth. Perhaps the strongest claim for Trinidad as the chosen capital site, by virtue of the motto of the Federation ("To Dwell Together In Unity"), is that its many ethnic groups give it an outwardly cosmopolitan atmosphere.

But does this cosmopolitan atmosphere really exist? The ethnic groups seem to mix, but in fact they are very much apart. For example, a small number of the East Indians are wealthy and influential and these wield a powerful influence over their poorer, less powerful brothers. The French Creoles, steeped in the traditions of their powerful ancestors, tend to have few or no dealings with the Negroes. Those of European stock justify their importance and maintain their domination on the grounds of their skin colour and wealth. The Negroes are divided, since those of lighter complexion tend to become anything else but Negro. Local politics are fought out on the grounds of "race"; unity of purpose is a far cry; lack of solidarity and national sentiment is everywhere made manifest, and behind the merriment, calypsos, steel bands, limbo dances, and carnivals there is so marked a hollowness that it drew the comment:

> Public life . . . has been almost devoid of the spirit of service whilst any sense of national unity has been strikingly absent. Commercialism and race antagonisms between Africans (those of African descent) and Indians have constantly eroded the foundations of national life.[3]

It is this environment that the West Indian Governments have seen fit to choose as the cradle of West Indian hopes, aspirations, and yearnings—the home of the federal capital. Thus there is room for

doubt as to whether the choice of Trinidad as the seat of the Federal Government is the right one.

In no other island is there a faster growing West Indian sentiment than in Jamaica. Because of this and because

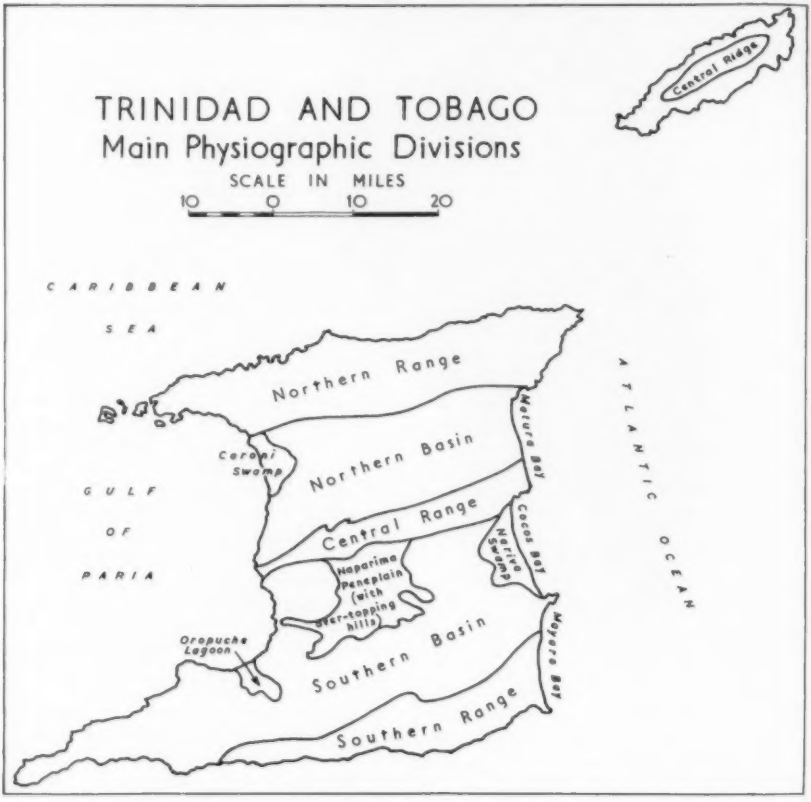

FIGURE 2

difficult terrain. The eastern half of the Northern Range (Figure 2) is too steep, and drainage of the swampy areas of the east would be more than an already meagre Federal revenue could finance. Furthermore, the cocoa plantations here are invaluable since agricultural land in the island is strictly limited (Figure 3). Perhaps the only suitable site in this part of the island is the Waller Field area which Trinidad's Chief Minister, Dr. Eric Williams, claims is reserved for the University of Trinidad. Here the water table is high, but more forbidding is the fact that most of the adjoining lands appear to be owned by Indians of the nationalist group which largely forms the Opposition, the

of her population and her larger contribution to the Federal revenue, Jamaica's claim to the capital site might seem to be paramount. However, the Constitution decrees that the federal capital shall be in Trinidad, and this decree cannot be revoked until the end of five years.

THE CAPITAL SITE IN TRINIDAD

The eastern half of Trinidad is unsuitable for a capital site largely because of

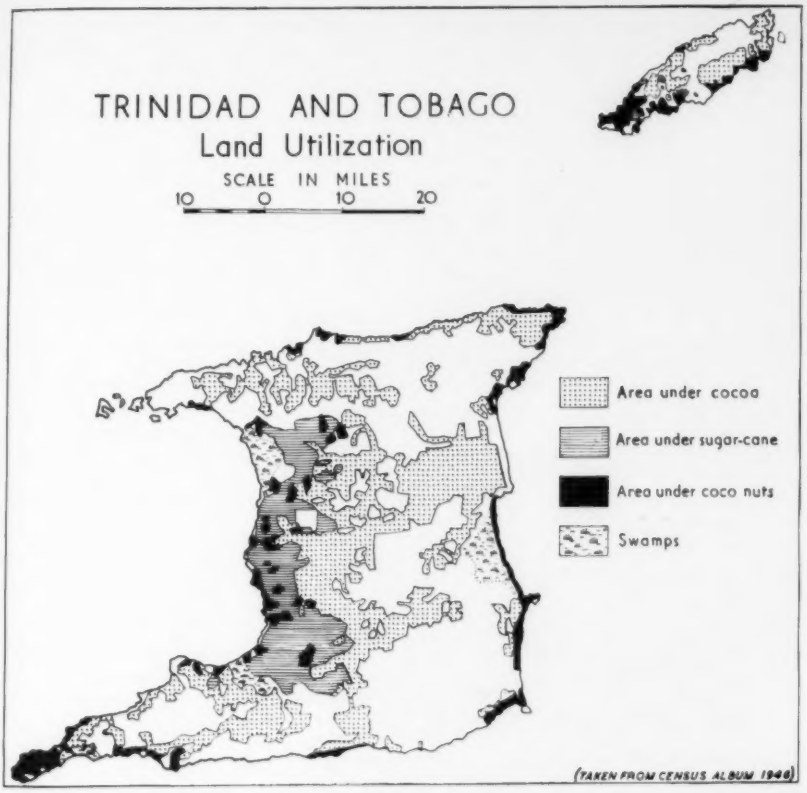

FIGURE 3

Democratic Labour Party. Since progress in Trinidad is affected by "race" antagonisms, and since the acquisition of the lands adjoining the Waller Field area would obviously bring more material gains, prestige, and power to a large number of the Hindu block, it would seem illogical for the West Indies capital to be placed in that area. Thus terrain, racial animosity, and local politics would suggest the siting of the capital elsewhere, for example, in the western half of the island.

Here, as in the eastern part, the slopes of the Northern Range are either too steep to allow easy building development or sufficiently steep to incur heavy expenses. Similarly, the swamp areas require a vast amount of capital to buy and reclaim the land. Thus the agricultural areas and the oil reserves are the only extensive tracts left (Figures 3 and 4). But sober judgment would on no account allow these economically vital areas to be taken over for use as a Federal District.

The remaining lands are the Chaguaramas area, including Tucker Valley, the southwestern peninsula or Cedros, and Carlsen Field in the County of Caroni. The last named is too low-lying and the Cedros is too far from the Piarco Airport and Port of Spain. The Chaguaramas area, on the other hand, seems to fulfil most of the requirements of the capital site. It has one of the most beautiful beaches on the island; there is room for building devel-

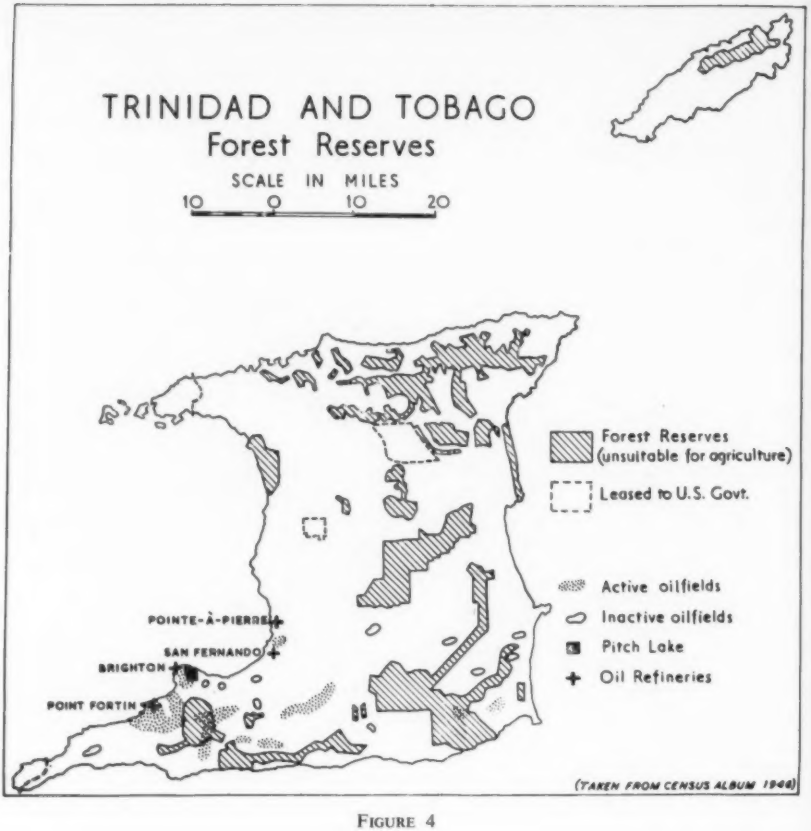

FIGURE 4

opment, and its advantageous position near to Port of Spain is heightened by its proximity to the airport. Thus geographical factors render Chaguaramas the most suitable site for the capital.

After the 1956 Conference had agreed that the federal capital should be located in Trinidad, a Standing Federation Committee was appointed to select the most suitable site in the island. The choice fell on Chaguaramas (site of the American Naval Base), which, during the dark days of 1941 was leased by the British Government to the United States Government for 99 years, an act which has now raised serious international, legal, and moral issues. Legally, the United States Government appears to have a dubious claim to Chaguaramas as well as to the other bases in Trinidad for the full 99 years of the Roosevelt-Churchill Agreement. Three of the many legal issues arising from the Agreement are: (1) There seems to be doubt as to its validity. The Agreement, as Dr. Williams has said, "places on the shoulders of the Government of Trinidad and Tobago the onus of introducing new legislation or amending existing legislation at variance with the laws of Trinidad and Tobago. Such legislation has not been implemented out of fear of the wrath of the population of Trinidad and Tobago." In other words, the leases of the Agreement appear never to have been registered.

(2) Dr. Williams has shown that according to the laws of Trinidad and Tobago on land regulations, "the Governor may grant leases of any portion of Crown Lands to any person for such purposes as may be approved by the Governor, provided that the lease shall be for such term not exceeding 30 years. . . ." As many of the leased areas are Crown Lands and as no authority for the disposal of Crown Lands in 1941 for 99 years can, in the view of Dr. Williams, be found, the leases are presumed to be invalid.

(3) As Trinidadian Crown Lands cost a minimum of 24 cents (B.W.I.) per acre and as the energetic Chief Minister and his Government are unable, despite thorough examination, to trace "any authority for abrogating the provisions of the Trinidad legislation with respect to the payment for Crown Lands," the validity of the leases is further questioned.

There is also the moral aspect. An arrangement was made between two foreign parties without reference to the people who were involved. This arrangement now robs these same people of their right to use their land in the way they desire, and they are denied the choice of their own land site for their capital—the symbol of their hopes. This moral issue falls outside the scope of this discussion. What remains to be considered, however, is the economic issue.

Countries that have leased bases to the United States Government in the post-war years have received considerable financial help from the United States as a result of their doing so. For example, in return for the bases Spain has leased (for two ten-year periods beginning 1953), she is receiving American economic and military aid amounting to $700 million (U.S.), including $200 million for base construction.[4] The agreement also secured Spanish sovereignty over the bases and the transfer of the installations intact if the United States stops using them. There are other examples of similar agreements.

Trinidad, and indeed the other West Indian islands, have received nothing. Trinidad is deprived, according to Dr. Williams and according to the Agreement of 1941, of direct grants for the lease of the Chaguaramas Base and other Trinidadian bases; deprived, by Article 29 of the Agreement, of harbour dues, licensing, and registration fees of American vehicles; deprived of the benefits of Immigration Ordinances, import excise, consumption and export taxes, income tax from American nationals on the Base, and rental from Crown Lands. The sum total of all this is that Trinidad, an underdeveloped country, is actually contributing financially to the operation of the American Base at Chaguaramas. Dr. Williams contends, too, that the Agreement has resulted not only in heavy damage caused by United States transport to Trinidadian roads (and Piarco Airport), the repair of which must be financed by the taxpayers of the island, but also in the loss of roads in the northwest peninsula and Waller Field—roads that had been built by the taxpayers of Trinidad and Tobago.

Thus for nineteen years Trinidad has suffered the loss of revenues, resources, and amenities. This is a matter galling to Trinidad whose Chief Minister asks:

> Has the United Kingdom Parliament or the Sovereign in effect exercised the right to dispense with or suspend the laws of Trinidad and Tobago relating to the duration of leases of Crown Lands? If so, what is the Constitutional foundation of that right? Has Trinidad's right to raise revenue by legal means, under law, been surrendered to higher power? If so, what is that higher power? Whence is it derived? What precedent has been constituted by this rent free lease in 1941?

While, therefore, the Federal Administration is temporarily in Port of Spain, the federal capital site continues to be a controversial issue. The Federal Government is unanimous in its stand for Chaguaramas and the Government of Trinidad and Tobago is making an insistent demand for it since Trinidad, not the Federal Government, is alone entitled to come to terms with the United States and the United Kingdom. So in a mood of friendly cooperation and good neighbourliness, the Trinidad Government has proposed the appointment of a commission comprising legal experts with the following terms of reference:

> to inquire into and report upon the legal basis of (*a*) the occupation by the United States of areas of Trinidad and Tobago from 1941 to the present day, and (*b*) the terms and conditions relevant thereto.

The capital site issue has become a political one, an international one, a live one, one that is tremendously involved, primarily because of the underlying geographical factor of a limited land area which must provide economic development, a federal capital, and a naval base. While there is no other suitable site for the capital but Chaguaramas, there is an alternative site, Irois Bay, for the naval base. Further, as an underdeveloped country, Trinidad finds it increasingly difficult to secure adequate loans abroad for her development. The United States, on the other hand, one of the most highly developed states of the twentieth century, should not find it difficult, financially, to remove their naval base to another Trinidad site.

Complex though the matter is, it clearly demonstrates the difficulty for undeveloped and underdeveloped areas of making available, for their own use and in their own way, the resources of their own land. It is a clash of interests which this century has seen repeatedly. Nevertheless, if the friendly persuasion of West Indian leaders, their strength of will, their strong determination, and ability to see both sides of a matter are employed to the full (as were the Chief Minister's of Jamaica in his winning of bauxite concessions), then Trinidad and those West Indian islands that accommodate American bases should arrive at a satisfactory solution, in conjunction with the United Kingdom, to the problem of the West Indies capital site.

POSTSCRIPT

In December, 1960, representatives of the United States, the United Kingdom, the West Indies Federation and Trinidad and Tobago met in conference in Tobago to discuss the revision of the 1941 Leased Bases Agreement between the United States and the United Kingdom.

The new agreement returned to Trinidad 21,000 acres of land out of the 34,600 acres leased to the United States, including unused portions of the naval station at Chaguaramas. The agreement further provided Trinidad and Tobago with United States economic and technical assistance, and reduced to 17 years the duration of American tenure of the area retained. This would seem to suggest either that the West Indies Federation will start building its capital on that part of the Chaguaramas area that has been returned to Trinidad, or that the West Indies will be forced to wait for 17 years before it begins to build its permanent capital.

It must be mentioned, too, that a similar pattern of bases agreements have been made with Jamaica, Antigua, and St. Lucia, and that it is reported that all these agreements have been characterized by "a high level of cordiality and friendly relations."

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RÉSUMÉ

Cet article étudie certains facteurs de base — physiques, sociaux et politiques — qui exerceront une influence décisive sur le choix d'un site pour la future capitale de la Fédération des Indes occidentales.

L'auteur traite de conditions spécifiques telles que la disponibilité d'un espace adéquat pour la construction d'édifices, l'accès facile à une ville existante et à un aéroport, la contribution des gouvernements participants au paiement des déboursés fédéraux et la décision déjà prise par ces autorités d'établir la capitale fédérale dans la partie nord-ouest de la Trinité, soit dans le district de Chaguaramas.

Chaguaramas fut loué par la Grande-Bretagne aux Etats-Unis, pour fins stratégiques et militaires (base navale), en 1941 pour une période de 99 ans. Les autorités gouvernementales ont mené des recherches en vue de repérer, si possible, un autre site propice sur l'Ile de la Trinité. On en est arrivé à conclure que Chaguaramas est le seul emplacement propre à l'établissement d'une capitale et l'on devra de ce fait reviser l'accord Roosevelt-Churchill de 1941.

L'enquête a de plus révélé qu'il existe à la Trinité un autre site où les Américains pourraient déménager leur base navale. Cette alternative semble donc inévitable. Le problème n'est pas encore résolu, mais il est probable qu'une décision sera prise au cours de l'année 1961.

Geographica

READERS MAY BE interested to note that two of the authors in this issue, Professor T. L. Hills and Dr. D. Lowenthal, have published monographs in which there are bibliographies on the Caribbean area. These are:

Special Commission on the Humid Tropics, I.G.U., A Select Annotated Bibliography of the Humid Tropics, compiled by Prof. Theo L. Hills, Geography Department, McGill University, Montreal, Quebec, 1960. 238 pp.

The West Indies Federation: Perspective on a New Nation (David Lowenthal, editor), Columbia University Press, New York, 1961. 142 pp. (A selected West Indian reading list: pp. 101–35.)

TROPICAL RESEARCH PROGRAMME

GEOGRAPHY DEPARTMENT, McGILL UNIVERSITY

SINCE 1958 the Geography Department, McGill University has been developing a programme of research in tropical geography. Several related activities are involved.

(*a*) Research in micro-meteorology and climatology is carried out at the Tropical Research Station, Waterford, Barbados. Measurements of potential evapotranspiration and latent evaporation, using the methods developed by Thornthwaite and Robertson, are being undertaken in order to compare the computed and measured values in a trade-wind island area, and to calculate the soil moisture deficits and water needs of plants, especially of sugar-cane, with a view to the development of irrigation where this is necessary. These results are being used in a study of the phenology of the sugar-cane, in which the yield of experimental plots of canes, planted at intervals of one month from October to March, are being investigated in terms of soil moisture deficits, solar energy incomes, and the accumulation of photothermal units. The long-term objective of this experiment is to prove that the period from planting to harvest can be shortened without lowering the yield of sugar-cane. The land would thus be available for the growing of other food crops for a longer period than is the present practice. The heat and water balances at the surface of the station are also being measured using both the evapotranspirometers which have now been installed for two years, and a permanent short-wave radiation recorder. The Waterford station is located on five acres of excellent sugar-cane land, granted to the Geography Department by the Barbados Government. Instruments have either been presented or loaned by the following organizations: The Federal Meteorological Service (Caribbean); Columbia University I.G.U. Research Section; Quartermaster Corps, U.S. Army; Brace Bequest, McGill University; and the Central Experimental Farm Service, Ottawa. The station is co-operating closely with the latter organization on a number of projects. Co-operation has also been extended to the U.S. I.C.A. programme on St. Lucia, where a similar station is now to be established. This programme, which is directed from McGill by Dr. F. K. Hare and Professor T. L. Hills jointly, and in the field by Mr. S. I. Smith, is financed by the National Research Council and McGill University.

(*b*) A Land Utilization Survey was initiated in 1958 and the final map is close to completion. This work was primarily carried out by Mr. James Anderson, now of Thistletown Collegiate Institute, Etobicoke, Ontario. The problem of a depressed standard of living engendered by acute population pressure is common to most of the Caribbean islands. None feel this more intensely than does Barbados, whose economy, overwhelmingly dependent upon a single commodity, sugar, lacks the flexibility that might lead to any significant

improvement. The primary classifications used on the survey are: (*a*) sugar-cane being cultivated on large estates, (*b*) peasant agriculture, largely cane being cultivated by peasant proprietors, (*c*) grasslands (sour grass and unimproved pasture), (*d*) rab land or scrub areas, (*e*) woodlands, (*f*) urban and other agriculturally unproductive land. A series of memoirs will describe the land use in detail and will trace the origin of contemporary forms of agriculture and settlement.

(*c*) Another phase of the programme is aimed at an investigation of the ecological, climatic, edaphic, and biotic factors involved in the origin and present nature and distribution of the savannahs of southern British Guiana and the Rio Branco, Brazil. Current plans call for a three-year period of experimental work.

(*d*) It is perhaps unnecessary to point out that one of the major activities is that of graduate student participation in all phases of the programme.

[THEO L. HILLS]

REVIEW

The Mineral Wealth of Wales and Its Exploitation, by TREVOR M. THOMAS: Oliver and Boyd, Tweeddale Court, Edinburgh, 1961. 248 pp., 30*s*.

THIS BOOK is a most complete guide to the economic resources of rocks and minerals of Wales, including Monmouthshire. Its main impact is the realization of the great quantity and great variety of mined and quarried materials produced within this area of less than 7,500 square miles.

Minor criticisms of presentation and writing are always possible. It is difficult to concede the use of "sterilise" (p. 75) in "Elsewhere . . . airfields and other military establishments sterilise large blocks of the various outcrops"; the meaning is clear but the operation appears radical. Occasionally names on the maps suffer distortion as a result of poor letter spacing, "Risca," for example, appearing as "Ri sca" provides an exotic quality unnecessary to Welsh place names. Further, in some sections details of place, time, and quantity might have been better portrayed in some tabulated form. But this, without quibbling, is an excellent book, well organized and well illustrated. All maps, and there are many, are clearly drawn and easily read; the photographs are unusually good and well chosen.

The short first chapter discusses the geological basis of resources, introduces the "solid" geology and the structural patterns, and relates them to the occurrence and distribution of minerals and rocks. The topic of coal takes up almost a fifth of the book and provides some extremely interesting and pertinent facts and conclusions. The discussion brings into focus not merely the considerable resources but also facets and aspects of mining which are basic to plans for the continued economic development of the coal industry in Wales; these include the complexity of structures, difficulties of operation, problems of rehabilitation of old mining areas, and re-development schemes.

The ensuing chapters discuss a variety of materials: slate; limestone; igneous rocks; sandstones and gritstones; clays and associated rocks; refractory materials including silica rock, fireclays, and dolomite; sand and gravel; iron ores; lead and zinc; gold; copper; manganese; and miscellaneous deposits. Some of these, gold and copper, for example, are mainly of historical interest; some, such as slate, are part of a declining but still significant industry; while others, silica rock and dolomite, which are used in refractory materials, represent increasingly important resources. All are discussed in terms of occurrence, availability, uses, and market conditions.

This book is intended for a rather special and localized market, but will probably reach a larger group than anticipated. It is a pity, therefore, that instead of fading away in a paragraph on peat, Mr. Thomas had not ended with a short chapter presenting general conclusions and some broad concepts of the place of the mineral industries in the economy of Wales.

[J. H. RICHARDS]